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ABSTRACT

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Abstract

Market shaping refers to planned proactive actions, which aim to modify a market. Market shaping phenomenon has been studied, however more research is needed to widen the understanding of this ample phenomenon. Previous research specifically emphasizes the need of longitudinal case studies focusing on the consequences of market shaping. Hence, longitudinal research focusing on the consequences of market shaping was chosen as the theme of this study.

This research combines results from several peer-reviewed articles to form a visual three-dimensional market shaping framework. According to the defined framework market shaping consists of shapers, actions, objects, targets, and consequences. All of the mentioned market shaping elements are interlinked and have a dynamic, versatile nature. Additionally, both external and internal events affect the market shaping process.

The empirical part of this research focuses on the changes in Finnish electricity production during years 2010-2020. Governmental action, namely passing The Act on Production Subsidy for Electricity Produced from Renewable Energy is defined as a market shaping event. This event consists of shapers, actions, objects, targets, and consequences. The key interest of the empirical part of this research is to find evidence that supports and further develops existing market shaping theory.

Versatile empirical data on electricity production provided information about the changes in the electricity market and increased the knowledge of the market shaping phenomenon. Specifically, this research provides results about expressions describing market shaping consequences. The nature of the consequences is identified and categorized based on the information gathered from previous research and evidence from this research. Orderliness, effect, significance, anticipation, immediacy, permanence, typicality, and linearity describe market shaping consequences.

Additionally, this research identifies several future research topics, and the need to deepen the understanding of market shaping phenomenon is apparent. Successful market shaping provides powerful opportunities for all market participants. Hence, this subject is important for both researchers and market participants.

Key words	Market shaping, electricity market

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Tiivistelmä

Markkinoiden muokkaaminen on suunnitelmallista ja proaktiivista toimintaa, jolla tavoitellaan markkinoiden muutosta. Markkinoiden muokkaamista on laaja-alaisesti tieteellisten menetelmien avulla tutkittu ja useita vertaisarvioituja julkaisuja aiheeseen liittyen on saatavilla. Tutkimustulokset kuitenkin korostavat, että lisätutkimusta tarvitaan, jotta tietämys tähän laaja-alaiseen ilmiöön liittyen kasvaa. Erityisesti on korostettu tarvetta pitkittäistutkimukselle, joka keskittyy markkinoiden muokkaamisprosessin seurauksiin.

Tämä tutkimus yhdistää ja tiivistää tutkimustuloksia useista eri tieteellisistä lähteistä. Työssä esitetään visuaalinen kolmiulotteinen markkinoiden muokkaamisen viitekehys. Määritellyn viitekehityksen mukaan markkinoiden muokkaaminen koostuu muokkaajista, toimista, kohteista, tavoitteista ja seurauksista. Markkinoiden muokkaaminen on dynaaminen ja monitahoinen ilmiö, jossa osatekijät vaikuttavat toinen toisiinsa. Lisäksi markkinoiden muokkaamistapahtumaan vaikuttavat sekä prosessin sisäiset että ulkoiset tapahtumat ja tekijät.

Työn empiirisessä osuudessa tarkastellaan Suomen sähkömarkkinan muutoksia vuosien 2010–2020 aikana. Markkinoiden muokkaamistapahtumana on eduskunnan päätöksen mukaisesti säädetty laki uusiutuvilla energialähteillä tuotetun sähkön tuotantotuesta ja sen vaikutukset sähkömarkkinaan.

Monipuolisen ja laajan tutkimusaineiston avulla havainnollistetaan markkinoiden muokkaamistapahtuman vaikutuksia markkinaan. Tutkimuksessa kiinnitetään erityisesti huomiota seuraamuksia kuvailevien sanojen tunnistamiseen. Suunnitelmallisuus, vaikutus, merkittävyys, ennakoitavuus, välittömyys, pysyvyys, tyypillisyys ja lineaarisuus kuvaavat mahdollisia markkinoiden muokkaamisen seurauksia.

Lisäksi tutkimuksen perusteella tunnistetaan useita potentiaalisia jatkotutkimusaiheita. Markkinoiden muokkaaminen on monipuolinen ja laaja ilmiö, joten lisätutkimusta tarvitaan tietämyksen kasvattamiseksi. Onnistunut markkinoiden muokkaamisprosessi on tehokas tapa muokata markkinaa suunnitelmallisesti. Tämän ilmiön ymmärtäminen on tärkeää sekä alan tutkijoille että markkinatoimijoille.

Avainsanat	Markkinoiden muokkaaminen, sähkömarkkina

UNIVERSITY OF TURKU
Turku School of Economics

DYNAMICS OF MARKET SHAPING AND ITS CONSEQUENCES

Master's Thesis
in Marketing

Author:
Leena Hacklin

Supervisor:
Ph.D. Jaana Tähtinen

15.5.2021
Pori

The originality of this thesis has been checked in accordance with the University of Turku quality assurance system using the Turnitin OriginalityCheck service.

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1 INTRODUCTION

1.1 Background

One of the key functions of marketing research is to deepen the understanding of markets and market phenomena. This research discusses the market shaping phenomenon and provides knowledge to deepen and broaden the market shaping discussion. The market shaping phenomenon has been scientifically studied; however, most studies are quite recent and additional research is needed to comprehensively understand the market shaping phenomena.

One of the core weaknesses of the traditional strategic marketing method may be that the customer and the market may not know or foresee the future possibilities. This conclusion has led to a new strategic method: market shaping. (Windahl et al. 2020, 1413.) Market shaping means that the market itself is proactively changed by a market participant or participants. Market shaping improves existing markets or creates completely new markets (Storbacka & Nenonen 2018, 107). Companies, governments, customers, and all market participants have means to change markets individually or in co-operation (Nenonen et al. 2019, 618). Market shaping phenomenon is dynamic, includes interactions, and causes change (Nenonen et al. 2014, 269).

The empirical part of this research focuses on examining market shaping in an electricity context. One of the main environmental concerns in recent years has been the increasing level of carbon dioxide in the air and the effect it has on the climate. Several activities, such as deforestation, burning and even breathing increases the carbon dioxide level. Energy production is one of the most important environmental topics. Furthermore, our society is dependent on electricity and even short power outages cause problems and annoyance. Hence, this research combines two important and current topics: market shaping is a powerful strategic method and electricity is an important part of modern life. Dynamics, interdependencies, and change are the key interests in this research.

Recent changes in the Finnish energy production business provide a diverse practical research subject. Changes in production cost structures, new environmental goals, customer expectations, and technological improvements have changed the market positions of different methods of electricity generation. For example, the market share of wind energy was less than one percent in 2010 but already ten percent in 2020 (Finnish Energy, Energiavuosi 2020). At the same time, the market share of electricity produced in separate

thermal power plants has steadily decreased. Evidently, the electricity market has undergone severe changes and these changes are expected to continue in the future. Therefore, the electricity market provides an interesting business ecosystem for a market shaping study.

This chapter ends with an extract of Ozzy Osbourne's song Dreamer. This extract was chosen to provide specific context and illustrate important aspects of this research. Research always includes viewpoints; therefore, it is like a gaze through a window and provides observations, not the comprehensive truth. Nevertheless, it describes a truth from a viewpoint. Additionally, Ozzy Osbourne emphasizes the importance of nature as does this research. Self-evidently, the wellbeing of our world is enormously important.

"*Gazing through the window at the world outside. Wondering will mother earth survive. Hoping that mankind will stop abusing her sometime. After all there's only just the two of us. And here we are still fighting for our lives. Watching all of history repeat itself. Time after time. I'm just a dreamer. I dream my life away. I'm just a dreamer. Who dreams of better days. I watch the sun go down like every one of us. I'm hoping that the dawn will bring a sign. A better place for those Who will come after us ... This time*" (Dreamer, Ozzy Osbourne 2001)

1.2 Electricity production in Finland

Electricity production affects environment and, besides being an important environmental issue, electricity is an essential part of modern everyday life. It provides light, heat, and powers devices and machines. Electricity production equals to electricity consumption constantly. It obeys the laws of physics and electricity production is therefore a technical matter. Additionally, it is an important economical factor. The value of electricity production in Finland was about two billion euros in 2020 (Finnish Energy, Energiavuosi 2020). The most common electricity sources nowadays are nuclear, combustible fuels such as peat and coal, and renewable energy, such as hydro, wind and solar (Finnish Energy, Energiavuosi 2020).

Electricity systems include electricity customers, power plants, the transmission grid, and networks. Finland, Sweden, Norway, and Eastern Denmark form a synchronous inter-Nordic electricity system and market area. The inter-Nordic system is connected to continental Europe, Russia, and Estonia by direct current transmission links. (Fingrid.) Cur-

rently, Finland is not a self-sufficient electricity producer: electricity imports from Finland's neighboring countries accounted for 18,5 percent in 2020 (Finnish Energy, Energiavuosi 2020).

Electricity is produced in power plants, such as nuclear, hydro, wind, solar, combined heat and power (CHP), and separate production. Each electricity production method has its unique features which are important to understand when examining electricity production. Nuclear, wind, solar, and hydro power do not produce carbon monoxide and are, therefore, considered environmentally friendly production methods. Fuel used in nuclear power plants is not renewable, however wind, solar and hydro are renewable. CHP and separate production burn different fuels, such as wood, coal, oil, and peat. Burning produces carbon dioxide, however, burning renewable material, such as wood, is categorized as an environmentally friendly production. Burning fossil fuels, such as coal and oil, causes carbon dioxide emissions, and fuels are not renewable. Therefore, they are not sustainable and environmentally friendly fuels. Additionally, peat is currently categorized as a non-renewable fuel.

Besides differing in environmental issues, each production method has a different means to adjust power output. Nuclear power plants in Finland produce electricity continuously at full capacity, except during maintenance periods, of course. Hydropower electricity production varies considerably and rapidly according to water supply and sometimes according to a market situation. Some hydropower plants can store water and therefore adjust production. However, not all hydro plants have reservoirs. Typically, a CHP is operated according to the needs for district heat. A CHP generates the highest amount of electricity when the demand for heat is highest, typically during cold winter days. Wind, solar and run-of-the river hydropower can be categorized as intermittent climate related energy (Engeland et al. 2017, 600). Wind electricity production varies constantly according to the wind speed and air density. Solar energy produces energy according to the sunlight.

Additionally, production methods differ economically. Different production methods have unique fixed and variable costs. Wind, hydro, and solar have low variable costs since the needed fuel is basically free. On the other hand, changes in fuel and emissions markets strongly affect the variable costs of gas, coal, and peat. (Vakkilainen & Kivistö 2017, 13.) All energy production investments require a considerable amount of capital, and investments are made for several decades. The cost of capital is a significant part of energy production cost.

1.3 Research questions

The main purpose of this research is to provide additional knowledge to the scientific discussion regarding the market shaping phenomenon. The focus is especially on the versatile nature of market shaping and the market shaping consequences. Besides providing results to the market shaping discussion, this research summarizes some of the main electricity market shaping consequences during years 2010-2020. The two main questions of this research are stated:

- What is the nature of the market shaping?
- What kind of consequences market shaping may cause?

1.4 Reasons, importance, and limitations of this study

Market shaping phenomenon has interested researchers; ergo, several recent peer-reviewed articles can be found. Previous research has identified a need for additional information to deepen the understanding of market shaping. For example, the need to research notable consequences (Nenonen et al. 2019) together with the need for additional longitudinal studies (Nenonen et al. 2020, 284) are recognized. These two identified and stated needs form the foundation of this research.

Finnish electricity production was chosen as the market shaping example for several reasons. Firstly, legislation and environmental emphasis have changed the energy production portfolio, and the amount of produced carbon dioxide has decreased (Finnish Energy, Energiavuosi 2020). Therefore, a change has happened, and it provides an opportunity to study consequences. Secondly, the electricity market is restricted and openly monitored. Therefore, a large amount of written and numerical data is publicly available for everyone interested in the subject. For example, Nord Pool, the Finnish Energy Authority, Finnish Energy, and Fingrid provide information about energy. Hence, the electricity market is an open book for research. Thirdly, electricity production is an important part of our everyday lives and an important economical factor. Fourthly, energy and market shaping are both current and viable topics: Customer expectations of environmentally sustainable energy and the targets of renewable energy have rapidly changed the electricity and energy market. Global and national influencers regularly debate and make arrangements that affect energy production and use.

The physical law of conservation of energy declares that energy can be converted in form, however it cannot be created or destroyed. Energy has many forms, for example,

potential, kinetic, thermal, electrical, chemical, and nuclear. Changes in the electricity market may affect the thermal energy market and vice versa. Even though studying all forms of energy might be interesting, this research studies electricity and especially the industrial-size electricity wholesale market. It is important to note that markets have several definitions and defining market boundaries is not self-explanatory (Diaz Ruiz 2020, 1391). Hence, it is accentuated that electricity production in wholesale markets is defined as a market in this study.

Another remark is the geographical viewpoint and the timespan. The Finnish electricity market is connected to the Nordic electricity market and additionally, connecting cables to central Europe and Russia exist. However, Finland is a single and uniform price area in the Nordic electricity market. Additionally, governmental decisions affecting the electricity market and possible consequences can be evaluated on a national level. Electricity production has consistently undergone changes. However, a timespan of ten previous years was chosen as one limitation of this research. Hence, the empirical part of this study focuses on the Finnish electricity wholesale market during years 2010-2020.

1.5 Philosophy of the research process

Ontological and epistemological perceptions and assumptions are always present in our lives and therefore present in scientific research as well. Understanding and identifying underlying relevant influencing factors is an important part of a scientific research process. Science is meant to be objective and transparent. However, as a human being our backgrounds consciously and unconsciously affect our actions and thoughts. Therefore, identifying and stating these important issues in the research report provides readers valuable information about the researcher and the research process. (Grix 2002, 176.)

Assumptions of the building blocks of reality form a researcher's ontological perspective (Grix 2002, 176). For example, culture, religion, and past experiences influence our mindsets. According to my basic assumptions, principles of natural science are constant and stationary. However, social phenomena are dynamic and reform constantly, and therefore my viewpoint is constructivism (Webster & Sell 2007). This research process consists of both aspects, processing unchanging laws of physics and changing social phenomena.

This research follows the definitions of subjective and nominal research in the philosophy of science. The phenomenon is studied, and findings interpreted through researcher's individual knowledge (Kögler 2007). Values and social experiences affect the

researcher's viewpoint and interpretations. The importance of environmental issues and freedom of choice are the core underlying values affecting this research process. Additionally, a master's degree in energy technology and a long history in energy-related work influence researchers' viewpoints. All data is processed through personal and subjective viewpoints. Therefore, the epistemological viewpoint of this research is anti-positive and interpretivism.

The approach to gain knowledge is idiographic. An idiographic method consists of gathering and analyzing data to understand and describe a contingent, unique, and subjective phenomena. The consequences of market shaping actions are complex, dynamic, and partly case-sensitive phenomena. Therefore, an idiographic approach is appropriate.

1.6 Research methods

This research includes theoretical and empirical research, which are combined iteratively. Additionally, this research obeys a scientific procedure where research is based on existing theory, which forms guidelines for analysis (Tuomi & Sarajärvi 2009, 117). Furthermore, during the research process, the existing theory and empirical research were in constant interaction and the understanding of the phenomena was broadened and deepened by an active iterative process (Dubois & Gadde 2002, 559). Hence, theoretical and empirical research methods are combined iteratively in an abductive method.

A longitudinal study, years 2010-2020 of Finnish electricity production is used to empirically study market shaping. Longitudinal studies reflect adequately dynamic change processes (Baker et al. 2019, 318) and therefore a longitudinal research method is appropriate for this purpose. The empirical part of this research combines quantitative and qualitative research methods in parallel to provide comprehensible longitudinal information (Flick 2007, 92-107).

This research process consisted of several phases: pre-understanding, framework development, iterations, and interpretations. The iterative process included categorizing, combining data, reasoning, and comparison. Hence, the research process is holistic (Stenbacka 2001, 554). Firstly, the focus was on theoretical investigation to gain knowledge about the market shaping phenomenon, learn about recent scientific studies and combine existing knowledge into a framework. Specifically, scientific peer-reviewed articles were examined, and information gathered. All analyses and notices were written in separate text files. These analyses were chopped, combined, reanalyzed, and summarized. The purpose of this process was to define themes and repetitive issues. Firstly, sketches of

market shaping framework were drawn, and main points were gathered. Secondly, data from the empirical electricity market shaping case were gathered. Once again, categorizing, combining data, reasoning, and comparison was done. Thirdly, based on analysis, additional theoretical information was gathered, and the framework was updated. Fourthly, data was gathered from interviewing four electricity specialists from three different companies. Fifthly, based on the increased understanding of the subject, theory and empirical case data was once more collected, analyzed, reviewed and results were gathered in this report.

1.7 Structure of this report

The report includes six main chapters: introduction, theoretical background, empirical research process, malleable electricity markets, outcome of the research process, and conclusion form a continuous portrayal of dynamic market shaping. A summary of each chapter is presented in the following text to provide basic information about the content of this research report.

The introduction chapter provides a preface about the research and describes the research topic, reasons for research, main limitations, and research questions (Kadhiravan & Thabah 2017, 39-43). This report starts with a description of the research subject; market shaping and its empirical case example: the electricity market in Finland. After providing background information about the research subject, two research questions are stated in a separate subchapter. Important information about the reasons, importance, and limitations of this research are described in the next subchapter. The philosophy of this research is explained in the following subchapter to provide a reader with knowledge about the main assumption and guidelines of this research process. The research method chapter provides information about how the problem was studied (Bhat et al. 2017, 48). This research includes both qualitative and quantitative research methods which are described in their own subchapter. The introduction chapter ends with a description about the structure of this report.

The second chapter is dedicated to the theoretical background of market shaping. Firstly, the constitution of a market is discussed. The research subject market shaping deals with market and, hence, examining theoretical aspects of markets is justified. Market shaping subchapters begin with a few real-life examples of market shaping events. These examples briefly narrate issues about market shaping to ease understanding of the phenomenon (Baldwin & Baldwin 1998; Siggelkow 2007, 20-24). Throughout analyzing

the peer-reviewed articles about market shaping, a specific framework of market shaping was made. A three-dimensional illustration of market shaping phenomenon is presented in this chapter. Furthermore, the market shaping subsections are labeled according to the identified framework factors: market shapers, market shaping actions, objects of market shaping, market shaping targets, and market shaping consequences are examined in separate subsections.

The third chapter provides information about the empirical research process. Firstly, methodology and methods used in this research are discussed and then description of data and methods of data analysis are reported. This research combines qualitative and quantitative methods to enhance divergency (Eisenhardt 1989, 533). Besides combining qualitative and quantitative methods, one of the main principles of this research is transparency; all numerical and written data are gathered from public sources. For example, data from Finnish Energy and Nord Pool are used to study market shaping phenomenon in an electricity market context.

Market shaping phenomenon is researched by using the Finnish electricity market during 2010-2020 as an empirical research subject. Specifically, market shaping is examined by using The Act on Production Subsidy for Electricity Produced from Renewable Energy Sources as market shaping event. The fourth chapter includes several figures and tables which is a good method to provide supplementary information to the text and visually present patterns, trends, and changes (Ramesh & Ananthakrishnan 2017, 66-72).

The fifth chapter gathers and summarizes the results of this study. The aim of this chapter is to state the importance of this research by analyzing and explaining research findings (Aghai & Carola 2017, 76-82). The chapter begins with a summarization of the answers to the research questions. Contributions to theory and practice are presented and explained in the following subchapters. Research process and results including limitations are evaluated in their own subchapter. During the research process several possible future research topics and viewpoints were identified and, hence, all of them are described in a subchapter.

Lastly, in the sixth chapter, research conclusions are explained to summarize the report. Together with an English and Finnish abstract, a conclusion chapter compiles all main aspects of the whole report. Hence, by reading only the abstract or conclusion chapter an overall perception of the research can be obtained. Additionally, in the end of the report, the researcher's personal feelings towards the research process and the journey of life are expressed.

Scientific research always uses previous research to support and test analyses. Valid references and accurate citations are an essential part of a scientific research process. (Mohta & Mohta 2017, 86-87.) Therefore, all reference information is available on the last pages of this research, and citations are presented in the text. Mainly peer-reviewed articles were used as a source of information. However, other articles, books, written texts, and numerical data were also used.

2 THEORETICAL BACKGROUND

2.1 What is this thing called a market?

Market shaping focuses on markets and therefore an understanding of markets forms the groundwork for researching market shaping. Alan Chalmers's book (1976) What is this thing called a science? explains the philosophy of science and its numerous development phases and different viewpoints. Chalmers's message about viewpoints and development is important in all scientific work. Inspired by his message, marketing literature is reviewed to extrapolate definitions of market, and the elements (Forlani 2003, 143) of what constitutes a market are stated in this chapter.

Market is an ambiguous concept and has several definitions in marketing literature and no uniform wording exists to state a universal meaning of a market (Diaz Ruiz 2020, 1391). It may be argued that some market definitions are good and some poor. Additionally, some definitions can be comprehensive and some narrow. Notably, market is a perception (Ulkuniemi et al. 2015, 55) and therefore its empirical counterpart or to what it refers to is always subjective, thus it depends on who you ask. Perspective affects the market definition. Justifiably, we may ask if an industry or a product is a market, or does the market always include a function perspective?

Typically, the word market creates an image of a bustling and bubbling town market. The simplest description of a market may be; a place that connects buyers and sellers. (Storbacka & Nenonen 2018, 30.) This wording focuses on location, which can be geographical or virtual. The definition also recognises connections, which is an important part of a market. However, a market includes more participants than just buyers and sellers. Additionally, a place that connects is a quite simplistic description.

A market consists of participants, actions, needs, and offers (Ulkuniemi et al. 2015, 55) and typically, a market includes a structure, competition, and repetition (Slater & Tonkiss, 2001). Markets also include institutional rules, norms, linkages, and governance (Kaartemo et al. 2020, 403-404). Markets and systems within it evolve by both random events and planned deliberate actions (Storbacka & Nenonen 2018, 27). Changes in one market system may interfere or benefit other markets and all participants. A market includes micro and macro level perspectives (Windahl et al. 2020, 1417) and both private and public resources. Obviously, even simple dyadic markets exist, and a market may even be formed for an expendable purpose.

Additionally, in the scientific literature markets are often defined as complex, adaptative (Nenonen et al. 2019, 626; Storbacka & Nenonen 2018, 17, 25, 46), and dynamic systems. Markets include multilateral dynamic relationships and networks and, therefore, are social systems (Storbacka & Nenonen 2018, 253). Furthermore, they are dynamic, malleable, and plastic (Nenonen et al. 2014, 269) by nature and therefore can be influenced (Nenonen et al. 2020, 276). Hence, markets evolve, and therefore tomorrow's market may differ from today's market.

Markets include an economic aspect and marketing science is therefore part of the economic science. A functioning market inheres value creation, which includes for example exchange and use value (Nenonen et. al 2018. 51-80). Collaboration, mutual benefit, and augmentation are essential factors in value co-creation. A market may benefit market participants by providing opportunities, learning, and leverage (Storbacka et al. 2011, 256). Market participants must actively identify, form, and utilize possibilities in order to benefit from the potential.

Some main arguments can be highlighted from the above text: Markets are complex, dynamic, interactive, and multifaceted. Justifiably, marketing science acknowledges and appreciates the rich nature of markets. The market definition discussion is ongoing and proves that scientific discussion constantly evolves and has a dynamic nature. Complex, integrated, adaptative, and dynamic markets constantly change (Storbacka 2018, 253). Some of these changes seem to be caused by random events and some by planned proactive processes. In summation, both spontaneous developments and planned proactive market shaping change markets (Nenonen et al. 2020, 277). This research focuses on the latter one: market shaping.

2.2 Market shaping

2.2.1 Examples of market shaping

A well-known proverb states that a picture is worth a thousand words and obviously an image is a powerful explanation method. Additionally, a written example of everyday life typically paints an image into our minds, hence it can be stated that using distinguished written examples gives readers information about real-life situations and often provides additional information, elucidates, eases understanding, and the memorizing process (Baldwin & Baldwin 1998; Siggelkow 2007, 20-24). To deepen the market shaping thought, several market shaping cases are briefly narrated in this section.

One of the most famous examples of the market shaping phenomenon is the rise of Apple and the demise of Nokia Mobile Phones. Nokia was one of the leading companies in the mobile phone market since the early 1990s and its future seemed golden. It was heavily involved in developing the Global System for Mobile Communications Standard (GSM) and the first GSM mobile phone call was done by a Nokia phone in the early 1990s. Short Message Service (SMS) and internet connectivity were first found in Nokia's portfolio. Innovation and product development were core activities in Nokia. By the middle 2000s Nokia was the leading company in the business arena providing affordable, reliable, and modern mobile phones to customers. 3G, a built-in camera, game console, and music were offered to customers by the end of the 2000s. However, regardless of past success, sudden changes in the market forced Nokia to sell its mobile phone business to Microsoft in 2013. The market had been suddenly shaped, and Nokia was the losing participant in the market. The market shaping act was done by Apple, who persuaded consumers to desire touchscreen devices. This changed the whole mobile device market and Nokia was weaponless. Ironically, Nokia had developed a touchscreen phone earlier than Apple. However, at the time in the early 2000s it was thought that consumers preferred keyboards over touchscreens and therefore, Nokia halted the touchscreen development process. (Storbacka & Nenonen 2018, 1-9.) Of course, this short summary of the story is not all-inclusive. Certainly, other factors also had roles in this rise-and-fall story. However, pivotal factors in Nokia's success were involvement in standardization, innovation, and product development. A crucial mistake was to underestimate the power of market shaping.

Another known market shaping example is Uber Technologies, which first established an online platform to connect car owners with customers needing transport. Uber was established in 2009 and it now operates in over 60 countries. The idea of Uber came from a need: co-founders Kalanick and Camp were frustrated by the difficulty of hailing a cab. Uber´s market shaping method was to provide a new combination of structure and technology. Needed resources already existed: vehicles, drivers, travellers, and smartphones. Non-professional drivers transport passengers, and activities can be done via an Uber application. (Storbacka & Nenonen 2018, 9-14.) Therefore, Uber offers an effective, easy, and swift alternative to taxi services. Its market shaping activity was to connect unused resource providers with those requiring a driving service.

Organic, vegan, vegetarian, and sustainable alternatives have conquered supermarkets, advertisements, menus, and even our fridges. Growing interest in animal rights, climate change, health (Janssen et al. 2016), and trends (Phua et al. 2019) have increased the demand of vegan and vegetarian food. Therefore, another market shaping example narrated in this section is Oatly, which offers plant-based alternatives to dairy products. Their most well-known product is oat milk. Recently, Oatly launched a provocative marketing campaign, which aims to modify customer preference to favour its products. Ethical, emotional, and political value statements can be used to shape customer preferences (Ledin & Machin 2020). Ledin and Machin (2020) state that "The problem is that such acts replace or shape what we know about, and how we act towards, actual socio-political matters." It is interesting that the words problem, replace, shape, know, and act are used in the same sentence. Specifically, the word problem draws attention: is an act that replaces what we know a problem, or can it be market shaping? Nevertheless, Ledin and Machin's article interestingly points out one fundamental market shaping factor: it shapes what we know and how we act (Nenonen et. al. 2019, 255). Oatly used environmental, animal rights, and health arguments in their milk-war campaign to shape what consumers know and how consumers act. The aim was to influence customers, which is typical in a market shaping process (Nenonen et al. 2019, 618), in favour of plant-based alternatives. For those reasons, the Oatly case may represent a fresh example of market shaping. The use of the word "may" is justifiable in the previous sentence because Oatly's milk-war campaign is very recent, and it has not yet been identified as a market shaping example amongst researchers. Oatly's milk war may be an example of radical marketing strategy but it has potential to become an example of market shaping.

An older example of market shaping is the triumph of the automobile. At first, cars were extremely expensive and therefore out of reach for common people. Henry Ford was fascinated by machines and saw enormous potential in self-propelled vehicles. Ford developed an assembly line technique which enabled mass production and made automobiles affordable. (Curcio 2013.) Developing the assembly line technique included planned proactive and purposeful actions, which aimed to change the market. Additionally, the changes benefitted Ford Motor Company and opened new market possibilities. According to hearsay Henry Ford stated that "If I had asked people what they wanted; they would have said faster horses". Even though the statement may not be Ford's true words, it emphasized one key element of market shaping: traditional market research offers information about customer needs, but market may include opportunities that customers are

not aware of and, hence, cannot state and anticipate (Nenonen et al. 2019, 255). This same phenomenon was identified in the Apple versus Nokia case where Apple offered customers something desirable that the customers had not asked for and, hence Apple was able to shape the market.

2.2.2 Market shaping framework

The present determines the future; however, the approximated and perceived present does not accurately determine the future (Danforth 2013). This famous chaos theory explanation provides food for thought even for market shaping phenomenon. Everyday examples and research of market shaping provide information about the phenomenon; however, information always includes approximations, interpretations, and simplifications. A market itself is a nonlinear and dynamic system and therefore market shaping causes predictable, unpredictable, longitudinal, and divergent changes in the market (Nenonen et al. 2019, 620). Simplifications, perceptions, and imperfections are present when discussing an ample and multidimensional phenomenon. Regardless of market shaping's chaotic nature, patterns, distinctiveness, and repetitions are possible to identify in market shaping phenomenon.

Market shaping phenomena has interested many researchers, and several recent peer-reviewed articles can be found. This study pieces together research results and insights to constitute a framework for market shaping. Market shaping is planned proactive and purposeful actions, which aim to change the market. It includes participants, their agendas, and outcomes (Diaz Ruiz 2020, 1389). However, different wordings exist especially in who orchestrates the market shaping actions. Nenonen et al. (2019) summarize that market shaping includes planned proactive actions by a focal company to modify a market. Conversely, a broader description is presented in Storbacka's and Nenonen's (2018) Smash where it is stated that markets can be changed by companies, governments, and individuals. Hawa (2020) emphasizes that market shaping actions can be orchestrated by an individual or collective market participants. In conclusion, it can be stated that market shaping includes planned proactive actions by a market participant or collective market participants.

The target of market shaping is to produce new market opportunities or improve a current market (Storbacka & Nenonen 2018, 107). Hence, market shaping is a strategic method (Windahl et al. 2020, 1413), which aims to improve a market participant's or participants' position in the chosen current or prospective market. Previously strategic

tools and methods focused on analysing current markets to identify opportunities, finding a company's unique position, and based on identified opportunities and strengths, creating a master plan to outwit competition. Market shaping strategy consists of planned, proactive, and purposeful actions, which aim to modify the market to benefit the market shaping party or its interests. A market shaping strategy includes several phases, for example, recognizing the opportune moment to start the market shaping process, deciding whether to mastermind, orchestrate or support the process, preparing the process, and setting targets (Nenonen & Storbacka 2020, 265). It can be summarized that market shaping alters markets to benefit the targeted market participant or participants.

Market shaping is fragmented into fundamental elements and each of the market shaping elements is discussed in the following text. As stated earlier, market shaping aims to change the market. Several researchers have approached market shaping by asking questions. Windahl et al. (2020) discusses what can be shaped and how. Cova et al. (2021) summarizes questions: who initiates market shaping actions, how can markets be shaped, why are markets shaped, and what are the outcomes when markets are shaped. Fundamental questions for this research are formed based on the thoughts arising from previous research. Who shapes the market? How are markets shaped? What can be shaped? Why is market shaping used? What are the possible consequences of market shaping? Based on these five questions the market shaping framework is formed: shapers, actions, objects, targets, and consequences.

Inspired by market shaping phenomenon's multifaceted nature, market shaping elements are presented in a triangular pyramid in Figure 1. The triangular pyramid ("tetrahedron") is composed of four triangles. In a regular tetrahedron all faces are equal in shape and size and all edges are identical in length. Interestingly, four equally important shapes form a uniform object where four apexes are all in equal distance from each other. Market shaping consists of equally important elements, which are all connected with each other. Hence, the use of triangular pyramid to illustrate market shaping is justifiable. Consequences are presented in the middle of the triangular pyramid to represent how consequences are affected by shapers, actions, objects, and targets. Additionally, the use of a three-dimensional model provides a fresh perspective to describe a multidimensional phenomenon.

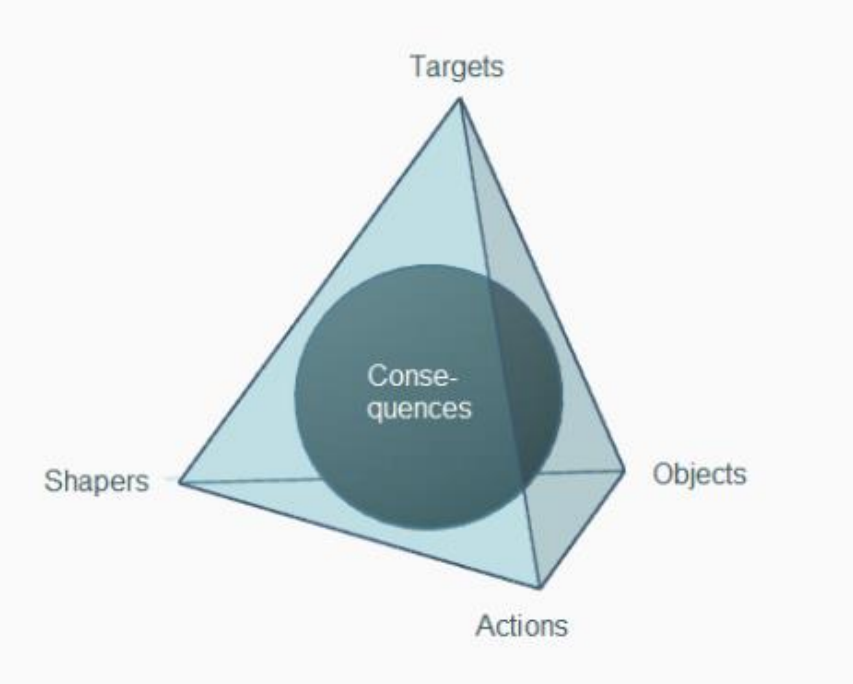

Figure 1. Three-dimensional framework of market shaping (adapted from Windahl et al. 2020; Cova et al. 2021)

Thus, market shaping framework includes shapers, actions, objects, targets, and consequences. Furthermore, all these elements impact each other. Companies, organizations, and governments have different possibilities to influence market objects and they also have different targets and action methods. Some market shapers have means to influence certain objects while some market shapers have no power to influence them. For example, companies have more possibilities to influence pricing and networks than to change norms, and governments may shape markets by tax reformations and legislative actions. Typically, reforming norms influences the overall market more than modifying exchange contents, like sales items, matching methods, and pricing (Storbacka and Nenonen 2021, 4). Different participants also have specific targets. Monetary targets and fulfilling values are identified as market shaping targets (Nenonen et. al 2020, 276). Companies typically aim for higher monetary results while organizations and governments often focus on fulfilling values.

A market does not exist in an isolated vacuum and therefore several internal and external factors are present and, also different levels or perspectives, for example micro, macro, meta and meso (Windahl et al. 2020, 1417). Different markets have an influence on other markets and for example, changes in economy and environment affect markets (Fehrer et al. 2020, 1426). A recent example of a sudden major change is the current

pandemic which has affected several markets (Nenonen & Storbacka 2020, 265). Furthermore, roles of all market participants, not just the market shaper's role, are an important part of market shaping. Market shaping succeeds only if needed market participants respond and correspond to market shaping initiation (Lipnickas et al. 2020, 1441). Identified market shaping may trigger resilience and counter actions (Beninger et al. 2021, 293) organized by market participants defending their position or pursuing their targets.

Therefore, the dynamic nature of markets needs to be recognised in order to fully understand the market shaping phenomenon. Figure 2 presents a market shaping event and external factors. The external environment is complex, dynamic and includes infinite amount of information and therefore, interpretation and simplifications are needed when studying ample phenomenon (Diaz Ruiz 2020, 1390). Therefore, this research focuses on a market shaping phenomenon with an internal viewpoint, however noting also that multiple external factors affect market shaping events.

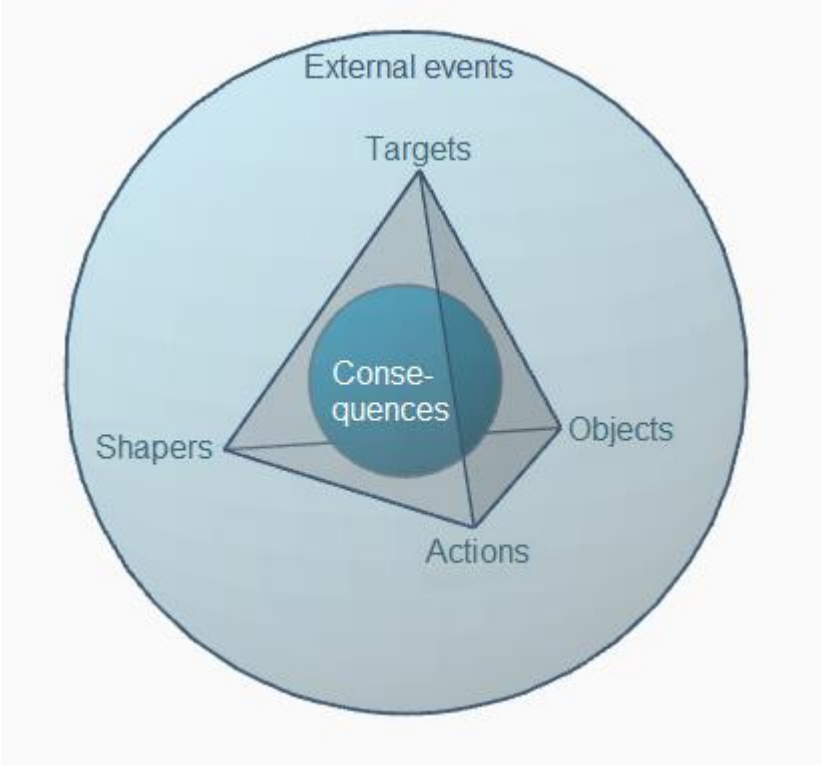

Figure 2. Market shaping including external events (adapted from Windahl et al. 2020; Cova et al. 2021)

In the following text each market shaping element (shapers, actions, objects, targets, and consequences), is discussed in detail. Firstly, parties who plan and perform market shaping actions are identified. Secondly, after analyzing market shapers, the focus is turned to possible market shaping actions. Thirdly, analyses about objects of market shaping are discussed. Fourthly, targets are described and pondered. Fifthly, market shaping consequences are described. In the last section, all main issues are summarized.

2.2.3 Market shapers

Identifying market shapers gives an answer to a question; who shapes the market? Sometimes it is possible to identify and name a single focal market participant that orchestrates market shaping (Nenonen et al. 2019, 618). For example, a market leader, contestant, or market intruder using market shaping may cause markets to change suddenly or gradually. Occasionally, market shaping may be a joint effort. Several market participants may use collective efforts to change the market itself (Hawa 2020, 55). For example, a branch of industry may share strategic goals and use collective market shaping techniques. Additionally, a shared value may provide several market participants with mutual goals which are aimed for by using co-operation. Nevertheless, market shapers do not always work in an orchestrated fashion, and therefore market shapers can be identified as a multifaceted and vibrant network (Baker et al. 2019, 301). The market shaping process may include participants with different roles, for example, masterminds, orchestrators, supporters, adversaries, and passives.

A focal company or group of companies may orchestrate market shaping. However, besides companies, all market participants have market shaping potential. Governments (Ulkuniemi et al. 2015, 54; Storbacka & Nenonen 2018, 32; Kaartemo et al. 2020, 402) and unions possess effective market shaping expedients. For example, legislation and monetary contributions are market shaping methods. Additionally, parties that can influence infrastructure (Ulkuniemi et al. 2015, 54), zoning, standardization and patents are potential market shapers.

Additionally, non-profit organizations (Herlin & Pazirandeh 2012) may have a role in market shaping event. Large organizations, especially, have purchasing power (Ulkuniemi et al. 2015, 55) and means to affect public opinions and set trends. For example, non-profit organizations may highlight environmental issues and change customer expectations, and even lobby for more environmentally friendly laws.

Ultimately, individuals have means to shape a market (Storbacka & Nenonen 2018, 32). All market participants, inter alia, companies, governments, unions, and organizations are groups of individuals. As a part of an entity, individuals' endeavours are often stronger than solitary efforts. Individual inspiration and insight may cause a snowball effect and cause market shaping events. However, complex markets seldom obey a linear cause and effect pattern (Nenonen et al 2020, 277; Fehrer et al. 2020, 1426) and a change typically includes different phases. The speed and significance vary during the process and, additionally, the level of participation by different market shapers may vary.

In summary, all market participants, including current and new, may use market shaping techniques and therefore can be identified as a market shaper. Also, it is important to note that market shaping can be done by a single focal composer or by joint efforts, and different participants may have different roles in the process. Co-operation, partners, and joint ventures may offer needed power for the change. Therefore, it is important to identify all relevant interest groups and stakeholders and arrangements affecting their behaviour. These arrangements include institutional arrangement, statutes, contracts, and customary practices (Hawa 2020, 48).

2.2.4 Market shaping actions

As stated, market shaping is planned and purposeful actions which aim to modify the market or provide new market opportunities. Actions are important in market shaping and, hence the market shaping phenomenon always includes a verb. Identifying how markets can be shaped provides information about market shaping acts and tools for strategic market shaping process. Market shaping actions answer a question; how a market can be shaped.

Market shaping actions include, for example, offering something new, improving existing products or services, educating, and lobbying. New or improved practices, processes, and solutions are methods to shape a market. Utilizing an effective method to organize the needed change is also important. New standards, regulation, and laws can also be identified as market shaping opportunities. Additionally, changes in social norms offer possibilities. Providing information, influencing, and targeting decision makers can provide means to change the market (Baker et al. 2019, 319).

Discovering and offering new solutions and value potential together with improving, broadening, and enhancing existing resource linkages, and mobilizing these resources are possible market shaping methods (Nenonen et. al 2019). Fostering and optimizing co-

operation as well as activating new linkages between participants (Nenonen et al. 2019, 617, Diaz Ruiz et al. 2020, 1392) provides market shaping opportunities by offering new opportunities and modifying existing possibilities. Supply, demand, need, and exchange (Ulkuniemi et al. 2015) may be modified, restructured, or developed in a completely new way. Market shaping actions also include changing customary practices, rules, and norms (Hawa 2020, 48) and reforming behaviours in the market (Nenonen et al. 2019, 618).

Market shaping action describes what is done and action may include an adjective describing how the action is done. A market shaping action may be public and openly communicated. For example, new laws fall into this category. On the other hand, market shaping actions may be done secretly. For example, company's market shaping innovation is probably launched abruptly without giving competitors any chance to cope with the change.

Besides an adjective, action also includes a time factor. Market shaping is a dynamic process, hence market shaping actions form an ongoing process: planning, doing, monitoring, and acting (Windahl et al. 2020, 1416). Strategic market shaping planning includes identifying existing market features and forming plans to elevate them. These plans are executed by developing new or enhancing existing market factors. Market changes and actions may require modification. Therefore, monitoring markets and market shaping is a crucial part of market shaping actions. Additionally, timing is an important part of market shaping (Nenonen & Storbacka 2020, 266; Peters et al. 2020, 1403). It can be summarized that market shaping actions include doing new things, doing existing things differently, and ensuring that the process proceeds towards planned targets.

2.2.5 Objects of market shaping

Identifying and understanding current market and future market possibilities forms a foundation to answering the question: what can be shaped, since all market elements and linkages are possible market shaping objects. Therefore, understanding the nature of the core market and all layers and perspectives of it is a part of market shaping object identification.

Supply and demand are present in a market and hence potentially subject to market shaping. Market shaping may target the content of exchange (Ulkuniemi et al. 2015, 60; Nenonen et al. 2019, 618), developing existing products (Nenonen et al. 2019, 623) and innovations. New and emerging technologies offer possibilities to elevate current supply (Kaartemo et al. 2021, 460). Market shaper activity may change current offerings, pricing

structure, and price levels. Hence, market shaping activities may target changing products and pricing (Nenonen et al. 2019, 255).

One core function of a market is that it fulfils a need. Therefore, a need itself and means to fulfil the need can be shaped (Ulkuniemi et al. 2015, 60). A need can be fulfilled by a product, service, or co-operation. New customers, usage methods, and desires offer possibilities for a change. Therefore, an element including customers and use is one market shaping object possibility (Nenonen et al. 2019, 255) However, besides fulfilling a need, a market provides value. Value is co-created by market participants (Tantalo & Priem 2016). Hence, market shaping activities may concentrate on improving or developing solutions to increase value.

A market consists of market participants and the connections they form or are capable of forming. Hence, market shaping may target the co-operation of several market participants (Nenonen et al. 2019, 618). A focal company, competitors, suppliers, partners, investors, government, organizations, and customers are often identified as market participants. Depending on a situation, other core market players may also be identified. Additionally, new market partners and relationships are possibilities that a market shaper may utilize (Ulkuniemi et al. 2015, 60). Hence, networks provide opportunities for a market shaping utilization (Nenonen et. al 2019, 255).

New channels, contacts, and offerings may shape the current market. Additionally, market shaping activities may target modifying and changing terminology, attitudes, and focuses of the market. (Nenonen et. al. 2019, 255.) A change in representations is one possibility to shape a market. Education, informing, and lobbying are activities that may change existing representations.

Additionally, standardization and new processes are methods to acquire market shaping goals. Government regulation and society's goals affect markets and impacting these provides powerful market shaping possibilities. Therefore, laws, guidelines, and practices are possible objects of market shaping and the market shaping actions may be targeted towards norms (Nenonen et al. 20149, 255).

In summation, all individual and combinations of current and prospective market elements are potential objects of market shaping. Depending on a situation a market shaper may focus the market shaping activities on a single or multiple market elements. Furthermore, since market shaping activity is a process, different objects may not be shaped simultaneously. A market shaper may, for example, firstly concentrate on forming a new need and secondly, focus on regulation changes.

2.2.6 Market shaping targets

Market shaping targets answer a question; why market shaping is used. Targets of market shaping are a combination of market opportunities and market shapers' interests. Different market shapers have different targets. Hence, it is important to evaluate different market shapers and their objectives. Companies, governments, unions, non-profit organizations, and individuals all have means to perform market shaping and their targets may vary. Market shaping targets of a specific market shaping case relate to the orchestrating party's priorities.

Market shaping targets or, in other words, intentions, may differ in many ways. Intentions may be individual or mutual and differ additionally in targeted time span. Both long-term and short-term goals can be set and identified. Additionally, as a market is dynamic by its nature, all market shaping factors are also dynamic and market shaping targets are shaped as the market itself shapes (Hawa 2020, 48). Hence, market shaping targets can be changed and multiple targets may exist simultaneously.

Firstly, companies' market shaping targets are discussed. According to the limited liability company law, Finnish Osakeyhtiölaki 624/2006, a company's purpose is to profit its owners unless the articles of association state otherwise. Gaining profit is typically a fundamental purpose of a company. Therefore, market shaping targets are often monetary and have an impact on the profit (Storbacka & Nenonen 2021, 1). Increasing sales has an impact on the company's financials. Increasing market share (Baker et al. 2019,318), demand, and price are methods to increase revenue. Additionally, a company may target market shaping actions to decrease manufacturing costs. For example, increasing performance and new supplier relationships may lower manufacturing costs and, hence, improve the profit.

Interestingly, articles of association may state that, instead of gaining profit, a company has another purpose. A limited liability company can be a non-profit company serving other than monetary interests of the owners. A non-profit company may, for example, provide resources or knowhow to owners. Another example of a non-profit limited liability company is the non-profit operating principle mankala, which is widely used in the Finnish power sector. According to the Finnish supreme court decisions KHO 1963-I-5 and KHO 1968 B II 521, under the mankala principle, the shareholders commit in the articles of association to cover the fixed and variable costs of operations and in return the shareholders receive the produced power pro rata to their shareholding in the company at

cost. Despite companies' different purposes, it can be stated that market shaping targets focus on improving a company's position in the market. Market shaping targets focus on increasing positive aspects and decreasing negative aspects.

After discussing companies' market shaping targets, governments and unions as market shapers are considered. Their targets are often related to economic, security, welfare, and environmental concerns. Laws, monetary support schemes, and zoning (Verbrugge et al. 2018, 659) are examples of notable market shaping tools that governments possess. For example, the European Union's environmental targets impact several markets in multiple ways. Primary and secondary targets may be identified. A specific market shaping case may include one or several targets and additionally, different targets may have unique schedules.

Non-profit organizations, like all market participants, have power to affect a market (Herlin & Pazirandeh 2012), therefore, thirdly, non-profit organizations' targets are considered. Non-profit organizations' targets are similar to a governments' targets and include, for example, environmental, humanitarian, animal rights, health, and equality aspects. Non-profit organizations use market shaping strategies to promote their interests. For example, choosing specific suppliers may impact the market structure since organizations have monetary power. Additionally, non-profit organizations may influence consumers and governments to further their goals.

Fourthly, market shaping targets of individuals are pondered. All market participants have values, and these values affect market shaping targets (Storbacka & Nenonen 2021, 1). Personal values like fairness, happiness, peace, responsibility, and wealth impact to the choices we, as individuals, make. Companies, governments, and organizations are groups of individuals with joint objectives and norms.

In summarization, market shapers' core reasons for existence affect the market shaping target setting. Growing, gaining profit, and fulfilling values are typical market shaping targets (Storbacka & Nenonen 2021, 1). A target also includes a time-element and a describing adjective. A market shaping target may be pursued immediately or it may be given time to advance. A market shaping target may also vary in the effect it has. For example, established targets may be enormous, moderate or something in between.

2.2.7 Market shaping consequences

Market shaping consequences answer a question; what are the possible outcomes of market shaping. Consequences can be categorized by the nature of the result. Firstly, the adjectives positive, negative, and neutral consequences may be identified (Cova et al. 2021 491). Secondly, consequences may be permanent or temporary. Thirdly, consequences may be evident immediately or take some time (Hawa 2020, 47) and noticing may take some time (Brodie et al. 2020, 1385). Hence, the adjectives sudden and prolonged consequences are used to describe market shaping consequences. Other adjectives can also be used to describe consequences of market shaping, for example, significant, minor, typical, atypical, anticipated, and unanticipated (Biggemann et al. 2013, 1084). Specifically, minor, atypical, unanticipated, and prolonged consequences may remain hidden and unnoticed for some time (Diaz Ruiz 2020, 1389). Additionally, perspective also affects the perceived nature of a consequence. For example, some consequences may be positive to some market participants and negative to others.

An adjective is one method to categorize the nature of market shaping consequences. Another method to categorize is affected market participants. It can be argued that market shaping affects all market participants: shaping party, other participants, and overall market (Nenonen et al. 2019, 617). Market shaping may benefit more participants in the system than just the shaper (Storbacka & Nenonen 2018, 158) and market shaping may also disturb several market participants, even the market shaper itself. Hence, market shaping may affect, for example, all companies, their partners, consumers, organizations and even governments. The consequence adjectives mentioned above describe how each market participant is affected. Market shaping targets also impact market shaping consequences. Consequences may be exactly as planned, completely different or something in between those two opposites. The gap between market shaping targets and market shaping consequences indicates the level of anticipated and unanticipated market shaping results.

Additionally, consequences focus on various market factors. The market shaping question; what can be shaped? indicates possible consequences related to various market factors and market structure. Ulkuniemi et al. (2015) identify five market shaping actions which impact supply, demand, need, exchange object, and exchange mechanism. For example, market shaping may form new market opportunities (Herlin & Pazirandeh 2012, 413) and new market spaces (Biggemann et al. 2013, 1090). Market shaping may also affect pricing, quality (Herlin & Pazirandeh 2012, 412; Nenonen et al. 2019, 255) and

perceived value. Market infrastructure (Ulkuniemi et al. 2015, 54), policies and technologies (Verbrugge et al. 2018, 659-660; Nenonen et al. 2019, 255) may be altered by market shaping. Additionally, a level of co-operation and networks may be affected by market shaping (Nenonen et al. 2019, 255) Customary policies, rules, standards, and norms that guide a market (Nenonen et al. 2019, 255; Hawa 2020, 48) may be deformed or shattered.

In summarization, possible market shaping consequences vary and hence, consequences are a versatile topic. Nevertheless, despite the dynamic and versatile nature, consequences can be categorized. Affected participants, affected market elements and the adjective describing the consequence provide information about the nature of a consequence.

2.3 Review of market shaping and its consequences

As discussed, market shaping is a dynamic and ample phenomenon. Researching this phenomenon requires summarizations and even simplifications of important characteristics. Therefore, key findings of each market shaping elements is presented in Table 1 that is structured according to the Figure 1 illustration of market shaping framework.

Table 1. Market shaping elements (adapted from Windahl et al. 2020; Cova et al. 2021)

	Shapers	**Actions**	**Objects**	**Targets**	**Consequences**
Question	Who shapes	How markets are shaped	What can be shaped	Why market shaping is used	What are the outcomes
Summary	Orchestrating party/parties	Planned and purposeful	Market elements	Purpose	Results
Examples	Company Government Organization Individual	Shape existing Form new Maintain Alter Educate	Elements Linkages Value	Profit Value	Describing adjective Affected - participant - element

All market shaping elements are linked together. Therefore, it is important to identify all elements when studying market shaping phenomenon. Answers to the questions who shapes, how markets are shaped, what are shaped, and why is market shaping used provides a foundation for market shaping consequence research. A single party or several parties may orchestrate market shaping and all market elements can be shaped. Target

and consequences are versatile. However, market shaping action is always planned and purposeful. Several examples of different market shapers, actions, object, targets, and consequences are also stated in the Table 1. A company, government, union, organization, and individual may perform market shaping activities. Market shaping activities may shape something existing and form new possibilities. Additionally, activities during the market shaping process, such as maintaining and altering, are needed. All market elements, linkages and values can be shaped. Typically, market shaping targets are related to profit or value, for example environmental targets. Describing adjectives, affected participants and elements describe possible market shaping consequences. Figure 1 and Table 1 can be used as a guideline in market shaping research and process. Furthermore, Figure 1 and Table 1 are helpful for a market shaper orchestrating party when planning and monitoring a market shaping activity.

The consequences of market shaping are separately presented in Figure 3. Market shaping may affect the overall market system and market elements (Nenonen et al. 2020, 278). Market element changes may be evident in a product's price, customers, use, channels, supply-side, representations, and norms (Nenonen et al. 2019, 254). Furthermore, adjectives describing the consequences have been identified by several researchers and these describing words provide information about the nature of a consequence.

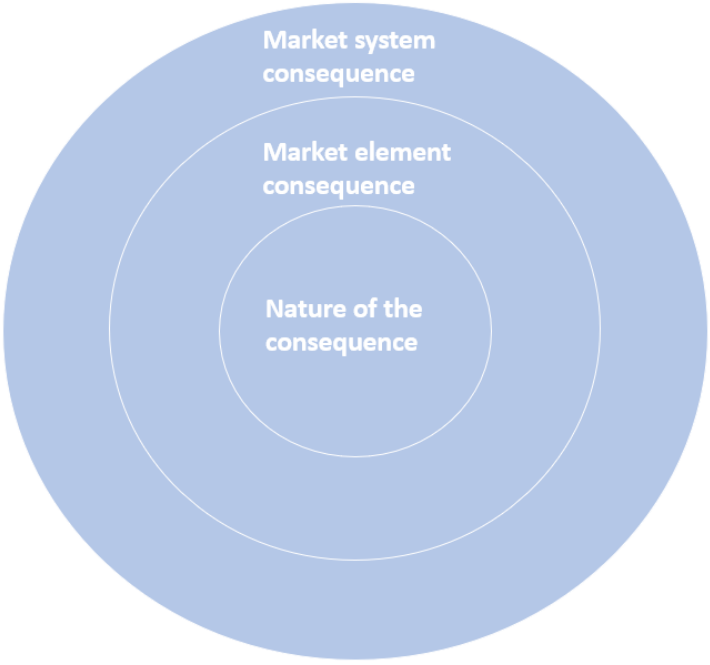

Figure 3. Market shaping consequences (adapted from Nenonen et al. 2020)

The next part of this research discusses a case study, and this presented procedure is used: Firstly, basic information about the chosen research method and case are described. Secondly, the market shaping event including market shaper, market shaping action, shaped market object, and market shaping targets are identified. Thirdly, market shaping consequences are identified and categorized. Consequences are presented by using Figure 3 categories: market system consequences, market element consequences and nature of the consequences.

3 EMPIRICAL RESEARCH PROCESS

3.1 Methodology and methods

According to the basic assumptions of this research a phenomenon obeys the unchanging laws of physics and includes constantly evolving social aspects. Market shaping is an ample phenomenon, and an idiographic research method is, therefore, suitable to deepen the understanding of this phenomena. Additionally, the use of versatile data provided broad and necessary information to describe market shaping.

Qualitative and quantitative methods share similar features (Hirsjärvi et al. 1997, 113) and complement each other. Hence, qualitative, and quantitative data can be combined to ensure divergent perspectives and data sources (Eisenhardt 1989, 533). Multiple data collection method strengthens theory by multiple sources of evidence and information. Versatile sources of data enhance options to cross-check, collate, combine, and analyze data (Grix 2002, 181). Therefore, to ensure divergent viewpoints and data possibilities, combining quantitative and qualitative material was used throughout this research project.

The empirical part of this research is based on the data collected by interviews, numerical data, and written documents. Transparency was chosen as one main principle in data selection. All numerical and written data used in this research are gathered from public sources. Even though the interviews are an important part of this research, all analyses based on interviews are cross-checked and analyzed by using numerical and written publicly available data. Hence, triangulation was used throughout this research process.

3.2 Description of the data

The empirical data of this research consists of interviews, numerical and written data. Multiple sources of data are needed to research a versatile and multilayered case. Hence, the versatile data sources provided several possibilities for combining data and ensuring analysis (Grix 2002, 181). All phases of this research process were interlinked, and iteration was used.

Energy is a very specific subject and expertise is needed to understand the underlying facts and realities. Hence, energy sector experts were chosen to be interviewed. All interviewees and the interviewer have a long work-history in the energy sector; therefore, all parties understood the main aspect of energy. No significant power asymmetry (Kvale

2007, 72) was present during interviews. One managing director, two directors and one specialist were interviewed. Interviewees came from three different energy sector companies. Each interview session started with a short summary of market shaping. The interview process obeyed an intensive interview method with broad and open-ended questions. These questions are presented in the Appendix. Factual narrative interviews produce stories (Kvale 2007, 73-75) and interviewees were encouraged to make statements and enhance specific information that they considered important. This method was chosen to ensure the validity of the interview data (Stenbacka 2001, 552). One hour was dedicated to each interview and all interviews were conducted via remote access. Interviewees pointed out important observations about the changes in energy production during years 2010-2020. These notices were gathered into a text file and based on the themes, categorized, and analyzed.

Numerical and written data was gathered from several public sources. One important source of data was Finnish Energy, an association which represents energy sector companies in Finland. Among other things, Finnish Energy is known for its statistics, surveys, and publications. This research uses three different data sources available on the Finnish Energy internet home page: annual reports on Finns' attitudes towards energy, annual presentations of electricity production, and annual hourly electricity production data by energy source.

The surveys on Finns' attitudes towards energy have been done annually since 1983. The survey examines and follows Finns' opinions and attitudes towards energy related issues. Each year about a thousand people answer specified questions. Results of the inquiry are reported and available for everyone interested in the subject. However, it is important to note that not all data is available: Annual report 2010 was not done and therefore no data is available for that year. Therefore 2009 and 2011-2020 reports were included in this study. Additionally, some answers were available only from year 2012 onwards. Furthermore, energy is a specific subject which requires an understanding of underlying technical, environmental, and financial aspects. Most studies assume that all responses are equal in content, hence provide an equal amount of information and are equally valid (Friesner et al. 2016, 32-34). The survey of Finns' attitudes towards energy specifically studies attitudes, hence the respondents' knowledge about energy does not affect the results and all answers are equally important. The Finns' attitudes towards energy 2020 report states that the statistical error for the research is 3,2 percent and in annual comparison 4,4 percent.

Each year Finnish Energy prepares a presentation of electricity production-related issues in Finland. These annual energy year presentations are available on Finnish Energy's internet page. The report shows statistics about, for example, electricity production, net imports, consumption, environmental issues, and prices. The presentations summarize key issues of Finnish electricity production and displays trends.

Additionally, electricity production by energy source data is available on Finnish Energy's internet page. Hourly quantities of electricity production, years 2010-2020, are presented in excel files. Hourly electricity production values for production, hydro power, wind power, nuclear power, combined heat and power, separate thermal power, import, export, and consumption are available in excel files. These excel files were used in this research to calculate changes during years 2010-2020.

Besides Finnish Energy, other data sources were also used. Nord Pool is the leading European power marketplace where market participants can buy and sell electricity. However, it is a voluntary marketplace: market participants can choose whether to participate in the Nord Pool market or use other markets. In 2020, about 70 percent of Finnish electricity consumption and production were sold and purchased using the Nord Pool market (Fingrid; Nord Pool). Nord Pool provides data about electricity prices; however, it is important to note that not all data is available. Nord Pool's publicly available historical electricity price data includes information from the year 2014 onwards. Therefore, hourly Finnish area electricity market prices 2014-2020 were gathered from Nord Pool's internet page into an Excel file. Additionally, it is important to note that the electricity market consists of several markets, for example, financial markets, day-ahead markets, intraday markets, balancing energy markets and frequency containment reserve markets. This research focuses on the day-ahead markets and even though changes in all markets would be interesting to evaluate, the day-ahead market was chosen as a limitation for this research.

Since the empirical part of this research focuses on a legislative market shaping case, data about the political atmosphere affecting legislation were gathered by reviewing government programmes. A government programme is agreed by the parties in the government, and it states government's main areas of activity and main targets as well as focuses. Hence, it can be view as a government's action plan. All governmental programmes since 1917 are found on the Finnish Government's internet page. Government programmes for each government during 2010-2020 were examined. Specifically, data regarding energy

production were gathered from each programme. Summaries were written in a text file and changes were analyzed using a timeline.

Additionally, several other publicly available documents and articles were studied. Fingrid and Energy Authority share important information on their internet pages. Additionally, peer-reviewed, and other articles regarding energy issues, were examined and needed information was gathered. All references are available in detail in the references section of this report.

Table 2. Summary of the main data used in this research

Source	Content	Additional information
Professional contacts	Interviews	4 interviews during spring 2021
Finnish Energy	Finn's attitudes towards energy	Annual reports 2009, 2011-2020
Finnish Energy	Electricity production information	Annual presentations 2010-2020
Finnish Energy	Electricity production data	Hourly data, 2010-2020
Nord Pool	Electricity price data	Hourly data, 2014-2020
Government	Governmental Programme	Terms during 2010-2020

3.3 Methods of data analysis

The analysis of the empirical data was interlinked with theory and hence theory-based explanations for findings were used. Research complies with the longitudinal research practices. Changes were examined during a ten-year period and all observations were gathered on a timeline. Since all data were gathered into a timeline, interdependencies and changes were easy to notice and identify.

Four interviews served as a foundation for the empirical part of the research. Interviews provided data about important external and internal events together with changes and main aspects of the energy sector in 2010-2020. All identified topics during interviews were categorized. Evidence to support interview analyses were gathered from publicly available data sources as described in the description of the data chapter.

The 2009-2020 surveys on Finns' attitudes towards energy were read and four questions were chosen to be analyzed in detail. The chosen questions examined Finns' attitudes towards the seriousness of climate change, support systems, willingness to pay higher prices, and electricity production method preferences. Analyzing the changes in attitudes between 2009-2020 was done by gathering annual results into a excel file and visually presenting these results using a timeline.

Finnish Energy's annual electricity production presentations were read and changes in production-related issues were written down. Annual presentations provided information about electricity production in Finland and its environmental impacts. These presentations provided information about the market level changes in the Finnish electricity market.

Hourly electricity production data includes information about hydro power, wind power, nuclear power, and conventional thermal power. Information about individual companies or power plants cannot be identified from the data. However, the data allows for examining changes in various production methods. Annual averages and total production values were calculated.

Additionally, Nord Pool's hourly electricity market price data was evaluated, and annual averages and changes were calculated. Furthermore, combining hourly production data and electricity market price data give plausible economic values for each production method (Kopsakangas-Savolainen & Svento 2013, 139). Calculated values were evaluated and compared.

Each governmental programme from 2010-2020 was studied and wordings regarding energy production were gathered in a separate file. Energy related issues stated in the programmes were gathered into a chronological narrative and summarized. Using a timeline for all analyses enabled noticing patterns, interdependencies, and linkages. Hence, combining data and analyses was one key interest of this empirical research.

Market shaping consequences were categorized according to Table 1. Market level changes were gathered separately and changes in market elements were identified by using categories: products, price, customers, use, channels, supply-side, representations, and norms (Nenonen et al. 2019). Additionally, the PESTEL method was used to identify possible market shaping consequences, even though, as Diaz (2020) points out, the PESTEL method does not notice the dynamic nature of market change. However, multiple data identification and analysis methods provided additional viewpoints and using PESTEL as a supportive identification method is justifiable. PESTEL is an acronym that stand for political, economic, social, technological, environmental, and legal issues. It is an environmental scanning tool, which can be used to identify and categorize aspects that may impact a research subject.

4 MALLEABLE ELECTRICITY MARKET

4.1 Shaping the electricity market

Examining changes in the electricity market provides knowledge about the change, however, case studies always include approximations, interpretations, and simplifications. For example, the Finnish electricity market has linkages to several other markets, nationally and globally. Furthermore, even weather conditions affect electricity markets. An infinite number of issues and factors affect the electricity market. Some of them are insignificant and some are significant. Based on the interviews done during this research process some of the main issues and factors influencing the electricity market in Finland during 2010-2020 are described in the following paragraphs. However, it is important to note that the identification is not comprehensive and includes simplifications. Nevertheless, sufficient, and adequate information is presented to provide an overview of electricity market and its linkages.

According to the interviewees, it is important to notice both external and internal events affecting a specific market shaping process, for example, economic conditions and parallel market shaping processes. A market shaping process is constantly affected by both non-planned and planned events. Customer expectations, importance of environmental issues, reliability and future possibilities are especially important aspects in the energy sector. Additionally, it is important to simplify an ample phenomenon.

Firstly, issues affecting the production costs are discussed. Changes in the fuel market affect electricity production. Hence, statistical information of fuels was gathered. Throughout the observation period 2010-2020 the statistical price of woodchips has been around 20 eur/MWh. The price of peat has varied between 10-15 eur/MWh and the price of coal has varied between 5-15 eur/MWh. The price of gas has varied between 20-38 eur/MWh. (Tilastokeskus.) Hence, price changes in peat, coal, and gas have affected electricity production costs.

Besides examining the prices of fuels, information about peat taxation and emission prices were gathered. The taxation of peat was 4,9 eur/MWh during 2013-2014. During 2015 the tax was slightly lower at 3,4 eur/MWh and during 2016 quarter one the tax was zero. After that, the tax was 1,9 eur/MWh until the beginning of 2019. After 2019 the tax has been 3,0 eur/MWh. Hence, taxation of peat has undergone several changes during past years. Another interesting factor affecting production costs is the price of emission

allowance. Each production unit causing harmful carbon dioxide emissions needs to purchase emission allowances. Emissions allowances are traded rights representing carbon dioxide emissions. Changes in peat tax and emission allowance prices are presented in Figure 4. Specifically of note, the emission prices have significantly increased after 2017. These changes have affected the production costs in power plants using peat and in power plants needing emissions allowances. (Energy Authority.)

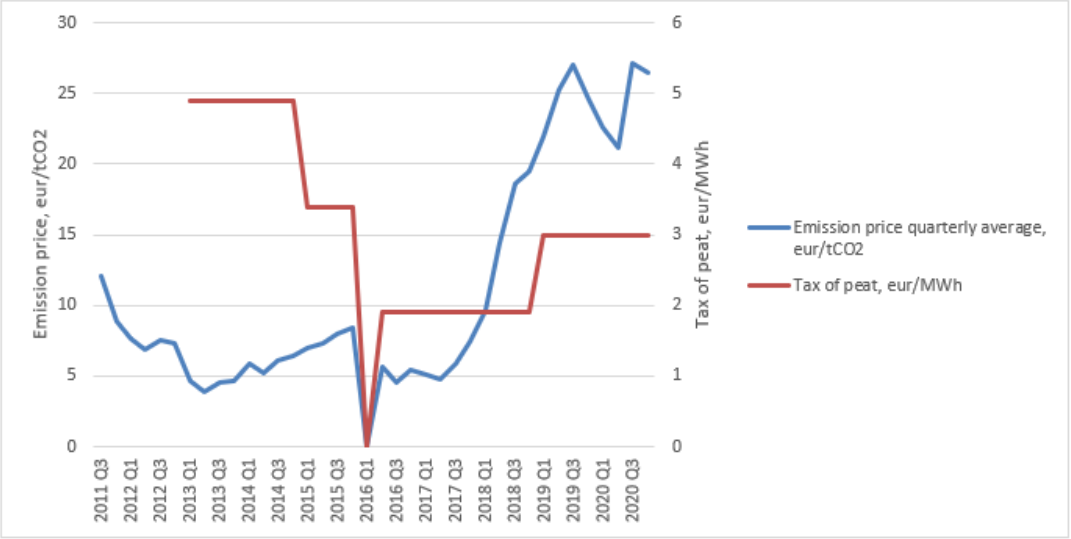

Figure 4. Taxation of peat and emission price during 2011-2020 (Energy Authority)

Changes in fuel and emission allowance prices, together with the changes in taxes, have affected electricity production. Several other changes and important issues can also be noted. For example, the erection of Olkiluoto 3 nuclear plant has been delayed, some power plants have reached their technical lifetimes, and new power plants have been built.

Another example of an external event affecting energy market is the change in the paper and pulp industry. Changes in paper and pulp mills have affected energy consumption and production. News about the closure of large factories provides information about changes in the Finnish industry sector. For example, Voikkaa, Kaipola and Tervasaari paper and pulp mills have encountered changes (Yle 10.9.2008; Helsingin Sanomat 15.10.2015; Insinööri-Lehti 26.8.2020). During 2020, Finnish industry used about 37,3 TWh of electricity while in 2010, Finnish industry used about 41,1 TWh of electricity (Finnish Energy, Energiavuosi 2010 & 2020). Hence, the industry sector has used nearly ten percent less electricity in year 2020 than ten years ago.

Even though the amount of electricity needed in industry has decreased, the demand for green energy has increased. During interviews, energy specialists stated that they have

witnessed the growing need for green electricity, especially during the past few years. Additionally, interviewees pointed out that the electrification of our society is a very topical issue. For example, the growing number of electric cars, geothermal solutions, and heat pumps are clear signs of electrification (Noll & McDonald 2019, 150-153).

Topics and examples presented in previous chapters point out that several unplanned and planned events have affected the energy sector. Despite the endless number of occurrences, studying the effects of a renewable energy subsidy was chosen as the case example to illustrate market shaping. However, it is important to note that several external events have also affected the process and outcomes. Recognizing important developments and external events forms a foundation for understanding the phenomenon.

As stated earlier, market shaping is planned proactive actions, which aim to change a market. Companies, individuals, governments, and organization have means to shape a market. This case study focuses on the governmental market shaping phenomenon. For example, setting laws, support methods, and taxes are powerful market shaping actions which governments can establish (Kaartemo et al 2020, 405).

The promotion of renewable energy is a part of the EU's and Finland's national climate policies. The Act on Production Subsidy for Electricity Produced from Renewable Energy Sources (1396/2010) came into effect in 2010. The production subsidy policy – in other words, feed-in tariff – was meant for power plants fueled with wind, biogas, forest chips, and wood-based fuels. Owners whose power plants were accepted in the system receive a production subsidy for twelve years. No new wind power plants were approved into the feed-in tariff scheme after 1.11.2017 and no new biogas and wood-based fuel power plants after 1.1.2019. The feed-in tariff scheme was open for forest chip power plants until 1.2.2021. (1396/2010.)

The purpose of The Act on Production Subsidy for Electricity Produced from Renewable Energy Sources is stated in the section 1§: The purpose of this law is to enhance renewable energy sources' electricity production and their competitiveness, as well as to variegate electricity production and to improve self-sufficiency in electricity production (1396/2010). The targets challenged the status quo of a market (Windahl et al. 2020, 1417) and included a need for interplay between different market participants (Fehrer et al. 2020, 1425), especially co-action of energy producers and the government. Additionally, the purpose enhanced value and created new rules (Fehrer et al. 2020, 1427) i.e., renewable energy as a value and a new law as a rule. Expectations are present in the

purpose and passing a law is an intentional activity (Baker et al. 2019, 301). Therefore, a market shaping phenomenon is identified.

In this example, the government orchestrates the market shaping and hence the government is identified as the market shaper. Passing a new law can be identified as a market shaping action. The law shaped the profitability of some production methods and additionally lowered investment risks by providing a certainty of a market price: a power plant investment is typically made for several decades. The feed-in tariff allowed investors to calculate investments by using about 83,5 eur/MWh as the market price for the first twelve years. The targets of this market shaping are public since they were described in the law: enhance renewable energy sources' electricity production, competitiveness, variety, and improve self-sufficiency in electricity production.

The above-mentioned provides answers to four of the fundamental questions of market shaping: who shaped the market, how was the market shaped, what was shaped, and why was market shaping used? This identified market shaping case provides opportunity to research the market shaping consequences. In the following text, the aim is to find answers to the fifth fundamental question: what were the consequences?

When examining the possible consequences of market shaping it is important to note that a change is often dynamic, non-linear, and multiple reasons affect consequences. Additionally, both presence and absence of a specific consequence is a research outcome. Market shaping may cause changes in just one or a few parts of the market or affect everything (Nenonen et. al 2020, 279). Firstly, overall changes in the market are identified and discussed. Secondly, changes in each market element are pondered. Thirdly, describing expressions are discussed.

4.2 Market system consequences

4.2.1 Changes in Market economy

Notable changes in economic activity, changes in the size of the market, and changes in economic structures are possible market system level consequences (Nenonen et al. 2020, 280). Therefore, the electricity market volume, price levels and price fluctuations were examined in this case example.

Firstly, the amount of needed electricity in Finland was examined. In 2010 the total amount of used electricity in Finland was 87,5 TWh while in 2020 it was 81 TWh. Between 2010-2020 the amount of electricity used in Finland has varied between 80 and 90

TWh. (Finnish Energy, Energiavuosi 2010 & 2020.) No significant change in the overall need of electricity can be noted based on the data.

Secondly, changes in the market volumes of different production methods were examined. In 2010 combined heat and power (CHP) accounted for 32 percent, nuclear 25 percent, separate thermal power 16 percent and hydro 15 percent of the electricity production. Net import was 12 percent and wind power 0,3 percent. In 2020 nuclear power accounted for 28 percent, CHP 22 percent, hydro power 19 percent of the electricity source. In 2020 wind power accounted for 10 percent of electricity supply in Finland and separate production accounted for 3 percent. Solar electricity accounted for 0,3 percent of the electricity source. (Finnish Energy, Energiavuosi 2020.)

The percentage values show that wind, CHP, and separate thermal power production have encountered the largest changes during the period 2010-2020. In ten years, wind energy has transformed from a niche sector to a mainstream industry while the amount of separate thermal power and CHP has decreased significantly. Additionally, the net import of electricity has not decreased even though that target was mentioned in the feed-in tariff law. The percentage share of each production method is illustrated in a Figure 5.

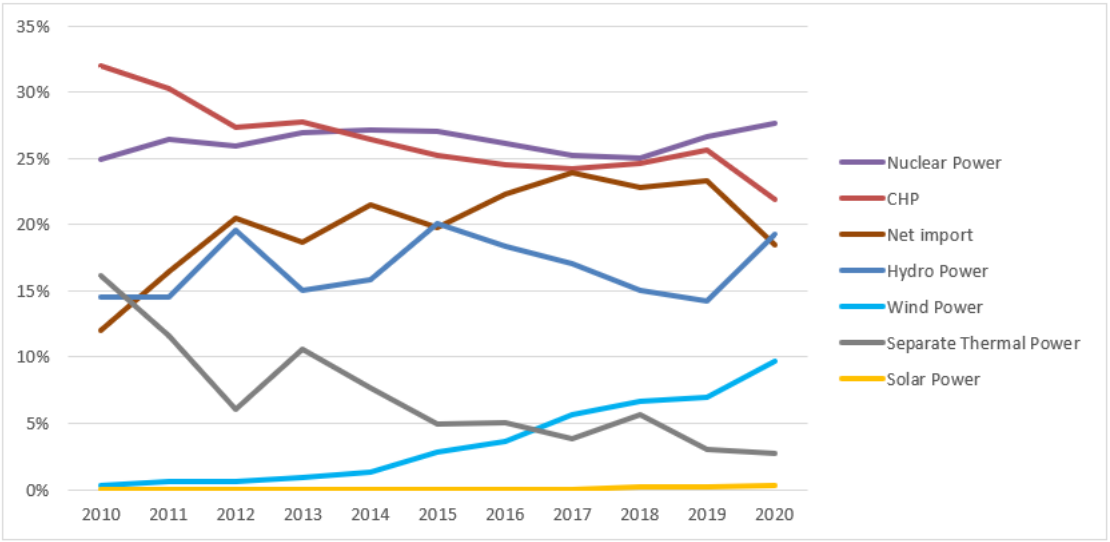

Figure 5. Production shares 2010-2020 (Finnish Energy, Energiavuosi 2010-2020)

Thirdly, evaluation of the overall changes in the price levels were concluded by using Nord Pool's hourly day-ahead price data. It is important to note that Nord Pool's historical data includes hourly day-ahead price from 2014 onwards. Hence, the period 2014-2020 was studied. The market price of electricity was 36,02 eur/MWh in 2014 and 28,00

eur/MWh in 2020. The 2020 average price was exceptionally low, for example, the 2019 average price was 44,04 eur/MWh and 2021 started with high prices as well. The annual average market price of electricity has varied between 28,00-46,80 eur/MWh during years 2014-2020.

Hence, no trend regarding the change in annual price can be noted. The hourly maximum and minimum electricity prices have also varied irregularly, and no trend can be observed from the data. Interestingly, negative prices for electricity became reality in Finland in 2020 when the hourly market price decreased below zero. Increasing the level of renewable energy increases the likelihood of negative electricity prices (Fanone et al. 2013, 22). The electricity price was below zero for nine hours in 2020.

Even though the annual average prices reveal price level changes, it does not indicate how the hourly price fluctuates and if there changes in sudden price increases and decreases. Therefore, the price difference of subsequent hours was calculated. Maximum, average, and median differences between two subsequent hours were gathered. No notable changes in maximum differences were found, however, median, and average differences indicate that sudden price fluctuations may have increased. Results are presented in Figure 6.

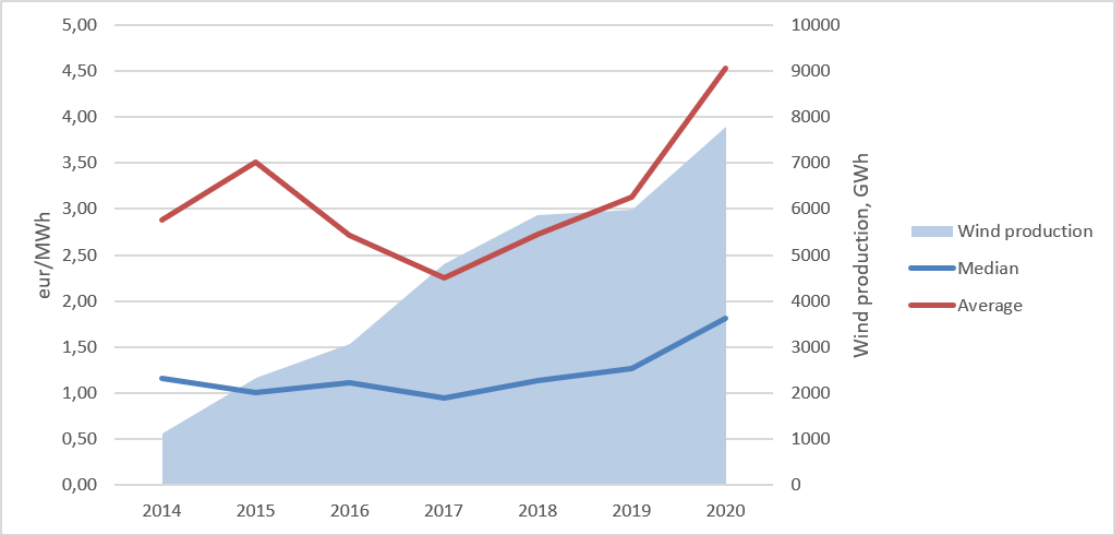

Figure 6. Price differences and the growth of wind production

Unfortunately, only the first few months of 2021 electricity prices are currently available since this research was done in spring 2021. Therefore, 2021 data was not included in the study. However, calculating these numbers again later when 2021 price data is available would be extremely fascinating because a trend in Figure 6 may be apparent. Results

indicate that it is possible that the increasing amount of renewable production increases the sudden hourly price changes, hence, the growth of wind production is also presented in Figure 6.

4.2.2 Institutional changes

Changes in rules, norms, practices, and assumptions are possible institutional market shaping consequences (Nenonen et al. 2020, 280). This example of market shaping was orchestrated by a government and hence possible political market shaping consequences are viewed through governmental programmes. Government programmes describe the main emphasis of the government, and methods to acquire targets. In the next paragraphs, main topics from government programmes are gathered. A summary of the topics is presented in Table 3.

The programme of Prime Minister Mari Kiviniemi's Government 2010 mentions economic welfare, sustainable growth, equality, and social integrity as the goals of the government. Taxation is mentioned as a method to improve sustainability. The programme additionally states that the government will continue to follow the programme of Prime Minister Matti Vanhanen II Government 2007, which specifically mentions increasing hydro power, wood-based bioenergy, and the energy use of waste. Furthermore, wind, solar, and heat pumps are viewed positively. Additionally, the programme states that on an environmental basis or after the end of their technical lifetime, coal power plants shall be replaced by bio energy power plants, and renewable sources of energy must be supported.

The programme of Prime Minister Jyrki Katainen's Government 2011 enhances the security of supply, moderate pricing of energy, and increases in self-sufficiency. The programme states a goal of replacing polluting energy production with low-emission energy production methods where possible. Goals include increasing wind, hydro, and wood whilst decreasing peat and coal.

The programme of Prime Minister Alexander Stubb's Government 2014 states that the goal is an open, fair, and confident Finland. Additionally, objectives in Katainen's programme stay valid. Interestingly, Stubb's programme uses a conditional sentence regarding an emissions reduction target: with respect to the EU 2030 Energy and Climate Package, Finland is prepared to accept a 40 percent emissions reduction target if the adjustment burden is shared fairly among member states. Additionally, the programme wording emphasizes competitiveness of the domestic fuels, namely forest chips and peat.

The programme of Prime Minister Juha Sipilä's Government 2015 enhances sustainable economic growth, improving employment rate, public services, and social security. The programme includes words like cost-efficient, carbon-free, clean, and renewable energy. Peat is included in the renewable energy target share. Interestingly, the programme does not include any mention of hydro power. However, the measures include a statement: "the wind tariff quota subject to feed-in tariff will be restricted. The wind power plants that are currently part of the feed-in tariff system and wind power plants that have applied for a quota decision will be included in the feed-in tariff system. The Government will issue as soon as possible a proposal on the quota restriction from 2,500 MVA to approximately 2,000 MVA."

The programme of Prime Minister Antti Rinne's Government 2019 emphasizes a socially, economically, and ecologically sustainable Finland. The energy use of coal will end by May 2029 at the latest. The energy use of peat will be decreased by at least half by 2030. The programme of Prime Minister Sanna Marin's Government 2019 names climate change, globalization, urbanization, the ageing of the population, and technological development in the introduction. Additionally, Marin's programme follows Rinne's programme. Throughout the programme, words like ecological, carbon neutrality, cleantech, responsibility, carbon sinks, biodiversity, emission-free, and sustainability are found. The programme states that one objective is carbon neutrality by 2035 and carbon negativity soon after that. Tax reform and energy aid schemes are mentioned as methods to achieve the targets. The programme specifically mentions several fuels and states goals regarding the energy use of different fuels. Conditions to ensure the growth of wind energy are formed. For example, zoning, offshore wind, and radars are mentioned. Extending current nuclear power plant permits are viewed positively.

Table 3. Summary of the notices regarding governmental programmes

Programme	**Statements**
Vanhanen 2007	Increasing hydro power, wood-based energy, energy use of waste Wind, solar and heat pumps promoted Coal power plants replaced by bio energy Renewable sources of energy supported
Kiviniemi 2010	Continues to follow the Vanhanen's Programme Sustainable growth
Katainen 2011	Security of supply, moderate pricing, increase in self-sufficiency Replacing polluting production with as low-emission energy as possible

	Increasing wind, hydro and wood whilst decreasing peat and coal
Stubb 2014	Objectives in Katainen's Programme stay valid Prepared to accept a 40 % emissions reduction target Competitiveness of the domestic fuels, namely forest chips and peat
Sipilä 2015	Cost-efficient, carbon-free, clean, and renewable energy Peat is included in the renewable energy target share Wind tariff quota subject to feed-in tariff will be restricted
Rinne 2019	Socially, economically, and ecologically sustainable Finland Energy use of coal will end by May 2029 The energy use of peat will be decreased by at least half by 2030
Marin 2019	Continues to follow Rinne's programme Carbon neutrality by 2035 and carbon negativity soon after that

It can be noted that all government programmes 2010-2019 promote the use of renewable energy. Additionally, diversity of different fuels is present in the wordings. Wind and wood-based energy are stated as good production methods. However, the attitude towards peat varies. Sipilä's programme includes peat in the renewable target whilst most programmes state that the energy use of peat should be decreased. 2019 Rinne's programme states that the use of peat will be decreased, and the growth of wind energy supported by non-monetary means.

Besides varying opinions towards peat, statements regarding law (1396/2010) in the Sipilä's 2015 programme draw attention. Sipilä's 2015 programme states that there will be major changes in the law (1396/2010): the wind tariff quota subject to feed-in tariff will be restricted. The Act on Production Subsidy for Electricity Produced from Renewable Energy Sources was established in 2010. Throughout 2010-2020 renewable and sustainability are present in the government programme wordings. However, in 2015 it is stated that the feed-in tariff will be restricted. Justifiably, Sipilä's 2015 programme' statement raises a question: Why is the orchestrating market shaper suddenly limiting planned action? The probable answer to the above question can be found in a monitoring report prepared by the National Audit Office of Finland regarding the feed-in tariff scheme. Document dated 29.10.2020 states that supporting wind energy by using a guaranteed price method has turned out to be more expensive than anticipated due to the unexpected price decrease of electricity. (Dnro 335/54/2015.)

The law 1396/2010 was modified several times during 2011-2018 and in 2018 a new technology-neutral renewable energy auction-based tender was launched based on the modified law. The new support scheme was open for wind, solar, biomass, biogas, and

wave power. The maximum number of accepted projects was limited to the total production of 1,4 TWh. However, only wind energy projects participated in the auction-based tender. Companies offering to build renewable energy production with the lowest needed subsidy were chosen in the system. The average winning prices varied between 1,27-3,97 eur/MWh and a total of seven projects were accepted. The subsidy amount depends on the average three-month electricity market price and the maximum subsidy amount is 3,97 eur/MWh. (Energy Authority.)

The low prices in the auction-based tender indicated that the production costs of onshore wind energy have significantly lowered, and likely soon onshore wind can be built without governmental support. Significantly, in October 2019 Tuuliwatti announced that the first wind farm built without governmental support started its production (St1 2019). After Tuuliwatti's announcement, several other wind production companies have also built wind farm without subsidies. Furthermore, it is interesting that only wind energy projects participated in the auction-based tender and no solar, biomass, biogas, and wave power projects participated in the auction.

4.2.3 Market level values

A change in values, preferences, and trends is a possible market shaping consequence (Nenonen et al. 2020, 280) and environmental issues are important values in today's world (Windahl et al. 2020, 1416). Therefore, electricity production's key environmental numbers were evaluated. The carbon dioxide emissions were 19,0 Mt in year 2010 and 4,1 Mt in year 2020. Specific emissions were 246 gCO2/kWh(e) in 2010 and 63 gCO2/kWh(e) in 2010. (Finnish Energy, Energiavuosi 2020.) Hence, the carbon dioxide emissions have decreased over 70 percent in ten years! The change in the level of carbon dioxide emissions of Finnish electricity production is certainly a significant and distinct market level consequence.

Studying market shaping includes questioning the desires and underlying needs of customers (Windahl et al. 2020, 1416). Therefore, surveys on energy-related opinions and attitudes were examined. Finns' attitudes towards energy annual reports years 2009-2020 were reviewed and analyses were gathered and analyzed. Not all questions were asked 2009-2011 and therefore only answers during years 2012-2020 are presented here. A summary of results is additionally presented in Figure 7.

The Finns' attitudes towards energy survey includes information regarding attitudes towards the seriousness of climate change. The survey states, "Climate change is a real

and serious threat which requires immediate global actions.” Possible answers include five options: agree completely, somewhat agree, difficult to say, somewhat disagree and disagree completely. The net value of results is calculated by decreasing percentage values of disagree answers from agree answers. The results indicate that climate change is seen as a serious threat. During 2012-2014 the net value is about 60 percent, during 2015-2018 the value increases to a level of 80 and during 2019-2020 the net value decreases to level 70. Throughout the observation period the seriousness of the climate change is evident in Finns’ attitudes.

During years 2012-2020 the surveys include a question “Is it right that renewable energy production is supported by tax funds?”. This question focuses directly on the acceptability of energy support mechanisms. The answers’ net value has remained near 50 percent throughout 2012-2020. During 2012-2014 the value was 51-52. During 2015-2017 the value reached its lowest levels 46-49. During 2018-2020 value increased to 53-56. Interestingly, the value lowered at the same time when political discussion about restricting feed-in tariff occurred.

The survey also includes a question “I am willing to pay a higher energy price in order to decrease environmental harms”. The answering options are same than explained in the previous paragraphs. Net value of willingness to pay more is 11 percent in 2012. After that value increases reaching its highest value in 2015; 30 percent. Value decreases to 17-19 in 2016-2017 and reaches value 25 percent in 2018. After that, the value decreases 2019-2020 reaching its lowest level -2 percent in 2020.

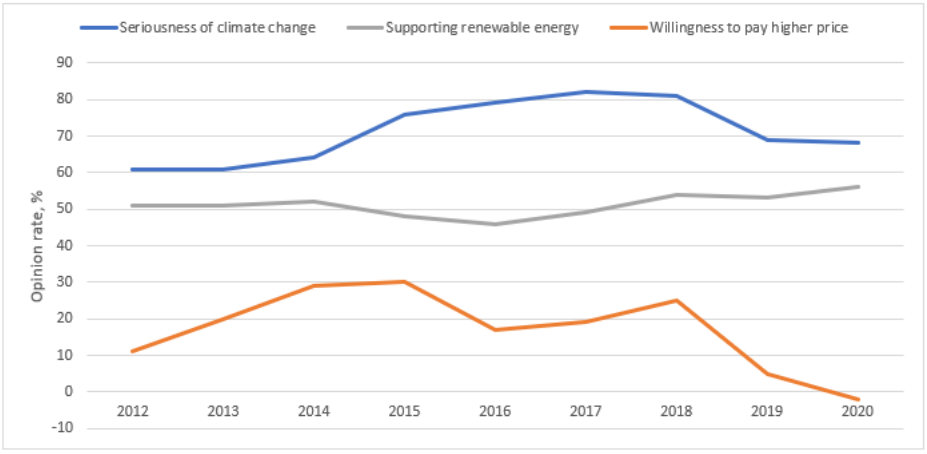

Figure 7. Attitudes towards climate change, supporting and willingness to pay (Finnish Energy, Energia-asenteet)

Governmental support i.e., tax funds, is seen more positively than personal willingness to pay higher energy bills. Additionally, net values in questions “Climate change is a real and serious threat which requires immediate global actions”, “Is it right that renewable energy production is supported by tax funds” and “I am willing to pay higher energy price to decreasing environmental harms” do not correlate. However, interpreting results of any questionnaire should be done cautiously. According to Ma et al. (2015) a questionnaire’s structure itself may affect the results even more than, for example, an individual’s energy consumption habits and socio-economic status when examining consumers’ willingness to pay more for renewable energy. Nevertheless, the results indicate that seriousness of climate change and supporting renewable energy are viewed more positively that personal willingness to pay more for renewable energy.

4.3 Market element consequences

4.3.1 Price and product

Change in products and price can be noted in several different ways. For example, the change may be evident in offerings, pricing, and price levels (Nenonen et al. 2019, 255). Studying changes in production costs of different electricity production methods was chosen to illustrate changes in products and prices. Vakkilainen et al. (2012) and Vakkilainen & Kivistö (2017) have studied competitiveness of different new power plant investments. The studies do not include hydro power because suitable new places for large hydro power are not currently available in Finland. Additionally, the studies do not include CHP because its competitiveness is often largely based on heat production.

The Vakkilainen et al. (2012) report states that the cheapest production method is nuclear 43,7 eur/MWh followed by onshore wind 52,7 eur/MWh and wood-based electricity 70,2 eur/MWh. Power plants burning fossil fuels are next on the list: coal 64,4 eur/MWh, natural gas 75,4 eur/MWh and peat 75,4 eur/MWh. In 2017, the report states that the cheapest production method is onshore wind 41,4 eur/MWh, followed by nuclear 42,4 eur/MWh. Wood-based electricity is 76,2 eur/MWh. Power plants that burn fossil fuels: gas 68,9 eur/MWh, peat 75,7 eur/MWh or coal 75,9 eur/MWh. Solar is the most expensive: 99,6 eur/MWh.

According to the reports, the production cost of wind energy has decreased by 20 percent during 2012-2017. Coal and wood-based electricity are more expensive production methods in 2017 than in 2012. Other changes are quite small. Solar was not included

in the 2012 study, and 2017 results show that the difference between solar and other production methods is still quite large.

Different production cost studies always include a variety of assumptions and calculation processes, therefore different studies are rarely comparable. Cost estimates provide rough information about prices and price developments, and hence, should not be used as guidelines for decision and policy making. (Larsson et at. 2014, 170.) However, Vakkilainen et al. (2012) and Vakkilainen & Kivistö (2017) indicate a trend: the price of wind energy has significantly decreased, and the price of coal and wood-based electricity has increased.

Some power generating technologies follow the peak prices of electricity better while some production methods are unable to adjust power quickly, at least they are not able to increase power, of course decreasing power is easier (Larsson et at. 2014, 180). Results shown in Figure 6 indicated that sudden changes in the hourly electricity prices may have increased in the past years. To study this further, the annual nominal net income eur/MWh of each production method was calculated by using the hourly Nord Pool's market price and the production data available in Finnish Energy internet page. The annual nominal net income of each studied production method was compared to the total average annual price eur/MWh of electricity. The difference between nominal net income and total average annual price is called a profile difference. Values are presented in Table 4. In Table 4 the values below zero are highlighted with a red color. A negative value means that the average price received from the market was less than annual average price. Respectively, a positive price means that the production method was able to target the peak prices of electricity and received a higher-than-average price from the market.

There are three important aspects to consider when studying the numbers in the chart. Firstly, Nord Pool historical market price data was available from 2014 onwards, therefore profile differences were calculated for years 2014-2020. Secondly, this calculation uses Finnish Energy's hourly production statistics and Nord Pool's hourly market price data. However, Nord Pool is a voluntary marketplace and not all production is sold in Nord Pool. For example, some electricity may be sold via dyadic power purchase agreements. Hence, not all production receives the Nord Pool's hourly market price. However, most electricity is sold in Nord Pool's marketplace and calculation results presented in Table 4 show what the profile costs are when using Nord Pool's prices. Thirdly, the elec-

tricity market includes several other markets besides day-ahead market, for example intraday and balancing energy markets. However, this research studies day-ahead markets and other markets are not considered as it is a chosen and stated limitation of this research.

Table 4. Profile differences during years 2014-2020

Profile difference eur/MWh	Hydro Power	Wind Power	Solar Power	Nuclear Power	CHP	Separate Thermal Power	Import	Export
2014	1,86	-0,93		-0,17	0,31	3,96	0,03	-0,92
2015	1,25	-1,77		-0,09	1,19	5,93	0,62	-2,67
2016	1,16	-0,83		0,03	0,99	4,74	0,07	-5,31
2017	1,70	-1,62	4,62	-0,07	0,08	2,85	0,39	-1,96
2018	0,49	-2,73	6,38	-0,09	-0,16	3,56	0,85	-0,76
2019	2,41	-3,27	5,39	0,00	1,31	5,70	1,23	-1,34
2020	2,29	-4,22	6,63	-0,53	1,96	7,25	0,18	-4,36

Results reveal several interesting matters: Throughout the period 2014-2020 hydro power has received a higher than annual average price from the market. For example, the annual average market price was 29,66 eur/MWh in 2015 and average hydro power received 30,91 eur/MWh from the market. Average wind power has received less than the average market price throughout the period. Data about solar power was available only from 2017 onwards. Low hourly market prices occur typically during nights when solar power is not producing any energy. Therefore, average solar energy has received significantly a higher-than-average price from the market. Nuclear power typically operates on constant power and only maintenance periods affect the received price. Therefore, the average nuclear price is close to the average market price. Typically, a CHP is operated according to the need of heat. Nevertheless, an average CHP has received a higher-than-average market price. Separate thermal power has received a higher-than-average price and therefore has been able to utilize the expensive market price hours. As expected, import has occurred on higher-than-average prices and export on lower-than-average prices.

Observations of this period indicate that the profile loss of wind energy is increasing. Several studies (Kopsakangas-Savolainen & Svento 2013; Hildmann et al. 2013; Djørup et al. 2018) have noticed that an increasing amount of wind energy production causes market prices to fluctuate and the effects are seen especially in hours when wind production is high, therefore the effect is noticeable in wind energy's profile difference. Hence,

results shown in Table 4 support previous research. However, more research is needed to verify possible trends.

Next, the effects of renewable energy subsidies are discussed. Wind power plants within the feed-in tariff scheme receive about 83,5 eur/MWh for their electricity. Part of it comes from the market and part comes from the government subsidy. The amount of paid subsidy varies based on a quarterly average of electricity market price and the market price of emission allowances. The subsidy price for wind energy is calculated based on the following summarization: Paid subsidy equals target price minus quarterly average electricity price. The target electricity price is 83,5 eur/MWh. If the quarterly average electricity price is less than 30,0 eur/MWh, the subsidy price reaches its maximum value of 53,5 eur/MWh. To promote a rapid increase in wind production the target price for wind energy was 105,3 eur/MWh until year 2016. The amount of subsidy for power plants using forest chips varies according to the emissions trading system's price. (1396/2010)

The annual average market price for electricity has varied between 29,66 - 49,30 eur/MWh during years 2014-2020. The annual average market price has been significantly lower than the feed-in tariff guaranteed price. Hence, power plants within the feed-in tariff system have received a higher price for produced energy than power plants that are not in the system. Additionally, it is interesting to note that wind energy production started to increase significantly after 2015, even though the feed-in tariff promoted rapid increase of wind by offering a higher price until year 2016. Therefore, the rapid increase of wind energy production in the early 2010's was not achieved, and the rapid increase occurred after year 2015.

4.3.2 Channels, customers, and use

New or improved channels to contact customers are a sign of a change in a market as well as evidence that existing products are used in new ways, and customer preferences have changed (Nenonen et. al 2019, 255). This research focused on the wholesale market and, therefore, channels, customers, and use are only briefly examined.

As mentioned in the previous chapter, electricity can be purchased in specific marketplaces, for example Nord Pool. However, Nord Pool is a voluntary marketplace and electricity market participants may use other purchasing channels. A renewable power purchase agreement (PPA) is one example of using new channels and structures in the electricity market. PPA is a long-term contract where a customer and a producer agree on long-term conditions of electricity supply.

Different contractual protocols exist, and these agreements can be categorized as Financial PPAs and physical PPAs. Despite different contract structures, PPA provides both parties price certainty: renewable energy for the customer, and financial security for the producer. PPA reduces the financial risk of producers and financing parties by securing the price level. In recent years, the number of PPAs have increased. (Tang & Zhang 2019, 1-4; Mendicino et al. 2019, 1-2.) The increase in the number of active PPAs is a sign of a new channel and method to purchase renewable energy.

A recent example of a PPA in Finland is Google's decision to purchase electricity from three wind farms. The contract is valid for ten years, and the electricity will be used in Google's data center in Hamina (Yle 11.8.2018). The decision to sign a PPA was justified by economic and environmental reasons. Another example of new channels is IKEA's direct investments in wind power. IKEA owns several wind farms in Finland and produces more renewable energy than its buildings use in Finland. Hence, IKEA is no longer merely a customer, it has become an energy producer as well. (YLE 23.10.2018.)

4.3.3 Supply side

All changes in the supply-side network are possible market shaping consequences (Nenonen et al. 2019, 255). During years 2010-2020 wind energy has increased more than other production methods. 125 wind farms, 55 wood-chip power plants and 4 biogas powerplants were approved in the feed-in tariff, hence over 50 percent of the new power plants within the feed-in tariff are wind power plants (Energy Authority). However, not all new power plants are in the feed-in tariffs scheme or even eligible for it. Nevertheless, the energy production statistics reveal that wind energy production has grown more than other production methods. Therefore, the investigation of supply side changes focuses on the changes in wind industry.

Increasing demand of a product often expedites competition and development. Increasing desire for feasible renewable energy production has entailed technological improvements. Wind turbine technology is constantly developing more powerful generators, taller towers, and longer blades. Maximizing production, minimizing costs, improving reliability, and availability are the key focus points of the development work. (Serrano-Gonzales & Lacal-Arántegui 2016, 2171-2173.)

Changes in wind technology are apparent. In 2010 the average power of wind turbines was about 2,5 MW while in 2020 the average power of a turbine was about 4,0 MW. Additionally, the average height of the tower has increased from about 90 meters to

about 145 meters and the rotor diameter has increased from 110 meters to 145 meters. (Finnish Wind Power association.) Additionally, Vakkilainen & Kivistö (2017) state that the production cost of wind energy has decreased significantly. Market shaping provides opportunities and leverage (Storbacka et al. 2011, 256) and evidently wind energy has utilized these possibilities.

4.3.4 Representations

Changes in representations include, inter alia, changes in terminology, stances, and viewpoints. An indication of change can be seen, for example, in descriptions used to portray a market element. (Nenonen et al. 2019, 255.) Therefore, throughout the data processing phase all indications about changes in representations were gathered. Specifically, Finns' attitudes towards energy reports were examined attentively and evidence about changes gathered.

In addition to numerical and graphical data, Finns' attitudes towards energy reports include written summaries. Specifically, the 2011 annual report includes wording that signals a change in overall attitudes and positioning of different energy methods. On page 1 the 2011 annual report states that "in current production reality some energy production methods are heavyweights, and some energy methods are mainly supplementary challengers: for example, if wind power multiplies by ten it will equal to two percent of the electricity production."

The report uses the word "heavyweight" and the example of wind power merely to explain the differences in proportions of different production methods and to point out how to interpret results. However, ten years later, that part of the report draws attention: the 2020 annual reports shows that the wind power equals almost 10 percent of the electricity production and cannot be identified as a supplementary challenger anymore. Evidently, the growth of wind power has been rapid, and it has affected representations.

Additionally, the Finns' attitudes towards energy research results indicate that climate change is seen more seriously now than ten years ago, and supporting renewable energy is viewed more positively than in the early 2010s. The interviews with energy specialists revealed that consumers expect energy companies to provide environmentally friendly electricity, and sustainability is an expectation and a necessity. These days, environmental issues are present in advertisements, information packages and marketing material provided by energy companies.

4.3.5 Norms

Changes in norms include changes in standards, regulations, and acceptability (Nenonen et. al 2019, 255). Environmental issues are an important part of energy production and therefore, changes in energy production acceptability were chosen to be examined. The Finns' attitudes towards energy annual reports includes a statement "To which direction should our electricity production be developed". Possible answers include four options: increase, current level is good, not able to answer and decrease. Each production method receives a net number which is calculated by decreasing the percentage value of decrease answers from the percentage value of increase answers. All net values 2009, 2011-2020 were gathered and reviewed and observations are gathered in the next paragraphs. Additionally, results are presented in Figure 8.

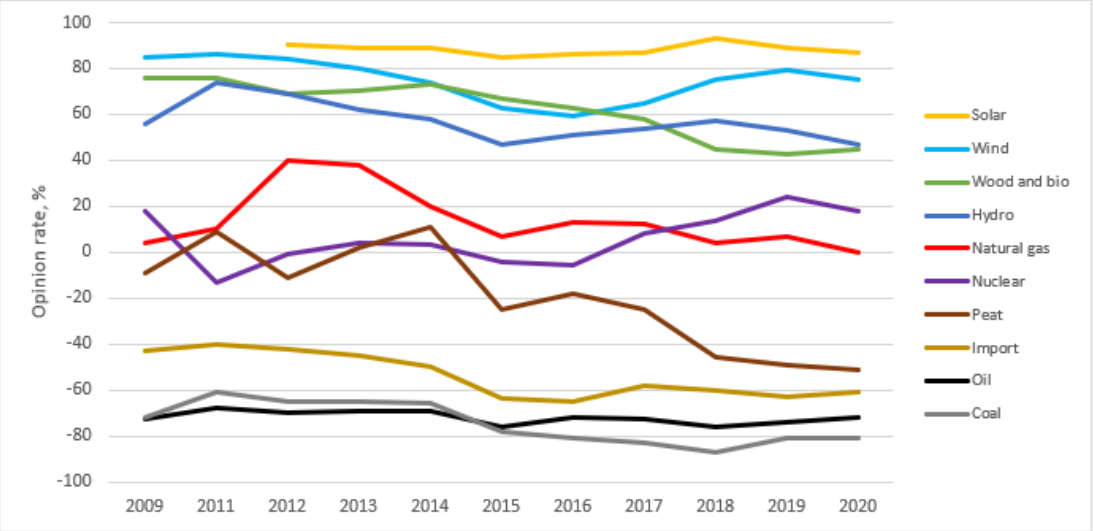

Figure 8. Opinion rate changes (Finnish Energy, Energia-asenteet 2009-2020)

Results regarding attitudes towards different electricity sources reveal that even though attitudes vary annually, different electricity sources can be divided into four categories based on overall 2009-2020 attitude value. The first identified category includes solar which has been the preferred electricity source during 2012-2020. The second category includes wind, wood, bio, and hydro. Those energy sources have been the next preferred ones. The third category includes natural gas, nuclear and peat. The fourth category includes import, oil, and coal.

The law (1396/2010) aimed to promote renewable energy sources, therefore observations regarding renewable energy are gathered first. The attitude towards solar energy

has stayed very positive throughout the observation period. Also, attitudes towards wind energy have been positive throughout 2009-2020. However, 2014-2017 overall results for wind were at a slightly lower level than before and after. Notably, the lower levels occurred at the same time as the political discussion about restricting the feed-in tariff. Attitudes towards wood and hydro have been on a good level throughout the observation period. However, both energy sources are less favorable in 2020 than 2009.

Secondly, observations regarding other than renewable energy sources are gathered. Attitudes towards natural gas were higher during 2012-2013 than before and after. Attitudes towards nuclear energy reached their lowest level in 2011, which can be explained by the Fukushima accident in 2011. However, after 2016, attitudes have improved and attitude level in 2020 is nearly the same than 2009. Attitudes towards peat have changed the most during 2009-2020. The attitude towards peat reached its best value in 2014 and after that, the attitudes have decreased. In 2020, the attitude towards peat is almost as low as the attitude towards import, even though the attitude towards peat was nearly the same as attitudes towards gas and nuclear during 2009-2014. Attitudes towards import, oil and coal have stayed at a low level throughout the observation period. Results towards import lowered slightly in 2015 and have stayed at that lower level since.

In conclusion, attitudes towards peat have varied and changed mostly, attitudes towards wind have been positive, even though years 2015-2017 indicated a slight decrease in attitudes, and attitudes towards wood including bio have somewhat decreased. To visualize the changes in attitude levels towards wind, wood and peat, values are presented in Figure 9 together with the annual wind energy production growth.

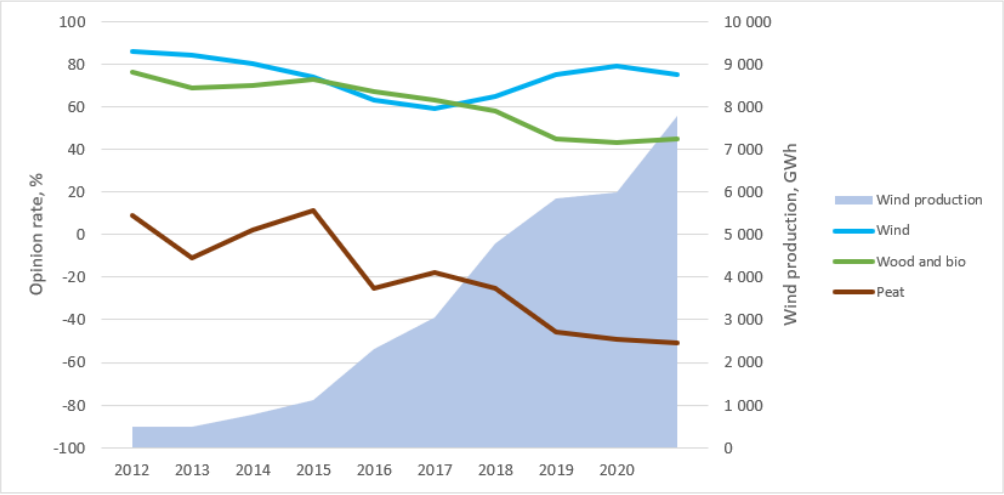

Figure 9. Changes in attitudes and wind energy production (Finnish Energy, Energiaasenteet 2012-2020; Electricity statistics 2012-2020)

Figure 9 illustrates that in 2015, wind energy production increased significantly and attitudes towards wind, peat and wood started to decline. However, attitudes towards wind increased again in 2018 even though wind energy production continued its growth. Observations indicate that consumer values change unpredictably and unequally (Diaz Ruiz et al. 2020, 1395). The increasing amount of wind energy has not significantly affected the attitude towards wind, while the attitudes towards peat decline as the peat energy production declines.

4.4 Describing expressions

The orchestrating party – the government in this case example – aimed to change the electricity production market by setting a new law. The purpose of the law was public and openly communicated. Four different targets are mentioned in the law itself: to enhance renewable energy sources' electricity production, and to enhance renewable energy sources' competitiveness, to variegate electricity production, and to improve self-sufficiency in electricity production (1396/2010).

The energy production statistic reveals that the share of renewable energy has increased, and additionally, the amount of carbon dioxide produced in electricity production has significantly decreased. Therefore, the first intended target has been reached. Research reveals that the production cost of wind energy has significantly lowered in the past ten years. However, the production cost regarding wood-based electricity and hydro have not decreased. Therefore, the second intended target was partially reached. The electricity production statistic reveals that nowadays, solar electricity is present in statistics. However, its share of the production is still quite small. Additionally, the 2018 new technology-neutral renewable energy auction-based tender was open for wind, solar, biomass, biogas, and wave power. However, only wind projects participated in the tender. Biomass and biogas are already in the Finnish electricity production portfolio; however, no industrial-scale wave power plants produce electricity in Finland. Therefore, the third target to variegate electricity production was only somewhat reached. Electricity production statistics reveal that the electricity import has increased during the 2010-2020 period. Therefore, the fourth target was not achieved.

This research revealed several significant unintended or unspecified changes. The amount of separate thermal power production has significantly lowered in the past ten years. The attitude towards peat decreased gradually from 2014, even though the 2015 government programme highlighted its importance in Finnish energy. The wind industry

has encountered significant changes. No longer is wind energy categorized as a challenger, supplementary, or lightweight. Several new wind project investments have profited turbine suppliers, which have continued product development. New turbines are significantly larger and hence more feasible than ten years ago.

Additionally, this research revealed several consequences that vary significantly when examined chronologically. The 2015 Governmental programme used a significantly positive tone about the energy use of peat. However, most other programmes view peat negatively. The 2015 Governmental programme revealed that the orchestrating market shaping party wanted to hinder its own market shaping process by restricting the quota amount. At the same time, the attitude towards wind and supporting renewable energy reached its lowest values. However, the seriousness of climate change reached its highest values.

Some plausible consequences were also identified. Positive attitudes towards natural gas, hydro, wood, and bio energy seem to have decreased. Additionally, plausible monetary consequences were identified. A negative hourly electricity Finnish market area price became reality in 2020. Research indicated that the hourly price fluctuation may have increased in the past few years. Additionally, changes in profile differences were identified. Even no change is a consequence. The amount of needed electricity remained quite constant throughout the investigation period. Additionally, the level of average annual price of electricity remained same.

Research points out that market shaping is a dynamic and ample phenomenon. It affects surrounding markets and is affected by non-planned and planned events. Market shaping causes changes in many levels. Changes also differ in the nature. For example, a market shaping consequence may be significant, targeted, and immediate. Market shaping is a process and hence longitudinal study is a suitable research method.

5 OUTCOME OF THE RESEARCH PROCESS

5.1 Answers to the research questions

The purpose of this research was to examine the versatile nature of market shaping phenomena. The research purpose was achieved by collecting data and evidence via theoretical framework and empirical data evaluation. The purpose of this research process was summarized into two questions:

- What is the nature of market shaping?
- What kind of consequences market shaping may cause?

The theoretical part of this research categorized and summarized main aspects of previous market shaping research. Knowledge from recent market shaping theories are gathered into a market shaping framework. Furthermore, recent market shaping consequence theories are gathered into a separate market shaping consequence framework. Both presented frameworks are based and substantiated by previous peer-reviewed research.

Changes in the electricity production market were chosen as the subject of the empirical research for several reasons. Obviously, electricity is an important and current topic. Additionally, due to the nature of the electricity market, vast amounts of data are publicly available and hence provide versatile research possibilities. Evidently, market shaping has caused changes in electricity production during the chosen period 2010-2020. Changes have been versatile, and available data allowed longitudinal research, which is especially suitable when studying change.

Based on the research process, answers to research questions were discovered. The three-dimensional market shaping framework illustrates market shaping elements and their dynamic interaction. Market shaping elements are shapers, actions, object, targets, and consequences. Market shaping is a dynamic and versatile phenomenon. It is in constant interplay with its surrounding reality. Hence, it is important to recognize the connections and interplay of external events. Market shaping causes versatile and dynamic consequences which can be categorized by several methods. For example, affected participants, market elements, and different adjectives can be used to categorize market shaping consequences.

5.2 Contributions to theory

5.2.1 Malleability of markets and market shaping process

Markets are adaptive, complex (Nenonen et al. 2019, 626; Storbacka et al. 2018, 17, 25, 46), plastic, malleable, and dynamic (Nenonen et al. 2014, 269). The findings of this study support the market shaping theories. In the case study, electricity production is changing due to market shaping, however, the production adapts, and new solutions, positions and possibilities are formed. The electricity market additionally proves that markets are complex in many ways. For example, understanding the price mechanism and technical limitations as well as possibilities is an important part of market research and participation. Markets can be shaped, and markets respond to changes. Dynamic features are evident in, for example, the chronological research findings. Markets constantly change; however, the change is not linear or evenly distributed, which furthermore is evident in the empirical research findings.

A market consists of elements (Forlani 2003, 143) and the elements are recognized in the market shaping phenomena. The theory-based elements (market shapers, actions, objects, targets, and consequences) are evident in the research case: the government sets a new law changing the profitability of renewable energy sources to promote carbon monoxide free production. The outcomes of this market shaping act include planned and unplanned consequences. Additionally, the empirical research proves that markets include a perception (Ulkuniemi et al. 2015, 55) by emphasis, for example, that consequences are positive to some market participants while negative to some participants. Additionally, viewpoints and the level of importance varies.

Markets evolve by random events and planned actions (Storbacka et al. 2018, 27) and, furthermore, markets are in constant contact with surrounding reality. As the visualization in Figure 2. Demonstrates, external events affect market shaping as well as market shaping affects external markets and events. In the empirical research findings, for example, the Fukushima nuclear accident affected the attitudes towards nuclear energy, recessions affected the willingness to pay more for sustainable energy, and CHP produced more energy during cold years than warm years. Random and irregular events are clearly present in the data. Additionally, the empirical data reveals that planned actions change a market; targets of the example market shape case are clearly stated in the law and some of the intended goals are reached by market shaping. This interaction (Fehrer et al. 2020,

1426) of internal, external, random, and planned is more evidence indicating the dynamic nature of markets (Nenonen et al. 2014, 269).

5.2.2 Longitudinal process

According to previous research, market shaping provides opportunities and leverage (Storbacka et al. 2011, 256). This research finds supporting evidence of seizing opportunities and the utilization of leverage. The renewable support scheme improved the profitability of new sustainable investments, therefore more investments were made, especially in the wind sector. Investments benefitted product development and more feasible turbines were launched into the market. Profitability continued to improve and simultaneously, needed resources became stronger as the industry grew. Knowhow, work force and machines improved and increased. Market shaping succeeds if needed market participants respond and correspond (Lipnickas et al. 2020, 1441). Evidently, the needed participation was achieved in the shaping of the electricity market example.

Market shaping resilience and counter action (Beninger et al. 2021, 293) is present in the empirical case example. Conspicuously, the market shaper itself is identified as a resilient and counter actor in the case example. Due to the unanticipated price decrease of electricity, the feed-in tariff scheme became more expensive than anticipated (Dnro 335/54/2015) and the government wanted to restrict the scheme. However, it may be argued that the government's aim to restrict the scheme is an example of modifying market shaping targets as the market itself shapes (Hawa 2020, 48). Nevertheless, resilience is present in the attitudes towards wind energy during years 2014-2017. Resilience can also be noted in the 2015 government programme which includes peat into the renewable energy target.

Market shaping affects all market participants (Nenonen et al. 2019, 617). This empirical research focused especially on studying how the renewable energy support scheme affected electricity production. All electricity producers encountered changes. Specifically, the use of nonrenewable fuels and separate thermal power decreased, while wind and import increased. Changes in profile differences were also observed. Additionally, changes in Finns' attitudes towards energy values were identified, as well as emphasis on governmental energy programmes. Hence, all studied market participants encountered changes during the observation period.

This empirical research supports previous research by proving additional supporting evidence that market shaping is a dynamic process (Windahl et al. 2020, 1416) including

planning, doing, monitoring, and acting. The process is particularly present in government work. Firstly, a new law was planned and put into force. Monitoring the consequences revealed that the electricity market price did not follow the used estimates and hence, changes were made. Secondly, the government tried to restrict the scheme and thirdly, new support system i.e., auction-based support was established. The last studied governmental programme does not include a new support system, however, it states that the growth of renewable energy is supported by, for example, zoning, and tax reforms. Therefore, planning, doing, monitoring, and acting are present in this governmental market shaping example.

Markets include multilateral dynamic relationships and networks (Storbacka et al. 2018, 253) and the changing elements of the market cause market change (Nenonen et al. 2019, 252). Therefore, a change causes change! This empirical research provides glimpses of change causing change. As the market share of wind has increased, the wind energy's electricity profile loss and price fluctuation may have increased. At the same time, when the energy use of peat has decreased the attitude towards it has lowered. Notably, an example of change causing change is present in 2014-2017 when wind energy increased, Finns' attitudes towards all energy sources lowered and the government made plans to restrict the fee-in tariff scheme and the Finns' opinion about the seriousness of climate change reached its highest values.

5.2.3 Nature of market shaping consequences

Obviously, market shaping causes a variety of consequences. Variety is also present when evaluating the nature of consequences. Positive, negative, neutral (Cova et al. 2021 491), predictable, unpredictable, longitudinal (Nenonen et al. 2019, 620), immediate, prolonged (Hawa 2020, 47), significant, minor, typical, atypical, anticipated, and unanticipated (Biggemann et al. 2013, 1084) consequences can be identified. This research revealed several different types of consequences. For example, changes in the wind industry were significant, the decrease of the electricity market price and its effect on the feed-in tariff scheme was unanticipated, and environmental changes were positive as the amount of produced carbon dioxide lowered.

According to previous research, market change is often nonlinear (Nenonen et al 2020, 277; Fehrer et al. 2020, 1426). Nonlinearity is present in this empirical research finding. An obvious example of the nonlinearity is the increase of wind energy production. During the years 2010-2013, the wind energy annual production increased from

about 290 GWh to 770 GWh. Then in one year, the wind energy production almost doubled reaching 1 100 GWh in 2014. In the next year, the amount doubled again reaching 2 300 GWh in 2015. The growth significantly increased after 2015. Additionally, nonlinearity is obvious in the Finns' attitudes towards energy results.

Previous research has identified market elements and affected participants and even describing expressions are mentioned in previous research (Biggemann et al. 2013; 1084; Brodie et al. 2020, 1385; Hawa 2020, 47; Nenonen et al. 2020; Cova et al. 2021, 491). However, even though previous research describes several consequences, no uniform categories of the nature of market shaping consequences have existed. Inspired by this observation, a framework for the nature of market shaping consequences was formed. The descriptive words were gathered under eight categories: orderliness, effect, significance, anticipation, immediacy, permanence, typicality, and linearity. The nature of market shaping consequences and examples are presented in Table 5.

Table 5. The nature of market shaping consequences and examples

Category	**Examples**
Orderliness	Planned, unplanned
Effect	Positive, neutral, negative
Significance	Significant, minor
Anticipation	Anticipated, unanticipated
Immediacy	Immediate, prolonged
Permanence	Permanent, temporal, varying
Typicality	Typical, atypical
Linearity	Linear, nonlinear, varying

Firstly, the category orderliness includes words planned and unplanned. Secondly, the category effect includes adjectives positive, neutral, and negative. Thirdly, the category significance includes significant and minor. Fourthly, the category anticipation includes anticipated and unanticipated. Fifthly, the category immediacy includes immediate and prolonged. Sixthly, the category permanence includes permanent, temporal, and varying. Seventhly, the category typicality includes typical and atypical. Eighthly, the category linearity includes linear, non-linear, and varying.

An identified consequence may be described by using one or several descriptive words. However, only one word from each category can be used to describe a consequence. For example, a consequence can be atypical, minor, negative, and permanent.

However, a consequence cannot be anticipated and unanticipated at the same time when observed from one viewpoint.

5.3 Contributions to practice

The results of this study can be used in market shaping research and practice. Market shaping is a powerful strategic tool (Windahl et al. 2020, 1413). Therefore, market shaping knowledge is important for market participants. The market shaping framework and consequence categories can be used in market shaping planning, execution, and monitoring. Additionally, this research provides knowledge, which can be used in market shaping education.

An example of a market shaping event is thoroughly described in this report. A vast amount of data was gathered, analyzed, and summarized in this report. All information can be used to repeat the study or to study another case example in a similar way. Hence, this research can be used as a guideline for future market shaping processes.

The empirical part of this research narrates the change that has happened in electricity production. These analyses are a foundation for studying future possibilities. The change is ongoing, and opportunities are viable. For example, fluctuating market prices may provide a possibility to power-to-x technology (Thrän et al. 2015, 1-3; Burre et al. 2020, 74-75). For example, profile loss results for different production methods are important information for energy professionals.

5.4 Evaluation of the research process, results, and synthesis

Evaluating research is an ongoing process and notices regarding the reliability, strengths and limitations should be assessed throughout the research (Eriksson & Kovalainen 2008, 291). Additionally, criticality should be present throughout the research process. Hence, throughout the report main notices, limitations, and issues are openly communicated.

The aim of the case study was mainly to identify market shaping components and the nature of possible market shaping consequences. Analyzing, summarizing, and comparing data by using a timescale and framework from previous research were the main analyzing methods. Even though this research includes numerical data evaluation and hence, some quantitative research methods, empirical data were processed mainly by qualitative methods, and the numerical values were used to describe changes and events. Hence,

evaluating the research process by using qualitative research evaluation is justified (Stenbacka 2001, 551).

All data used in this research, except the interviews, which provided guidelines for data collection, are gathered from public sources and available for everyone interested in the matter. Thus, the majority of this research can be replicated by other researchers, hence reliability is verified in this research (Eriksson & Kovalainen 2008, 292). Qualitative research includes subjectivity and interpretation, and a comprehensible description of the research process is needed to ensure the profound quality of this research (Stenbacka 2001, 552). Important information about the research process was shared throughout the report. Care in the research process requires systematic research methods and describing the process (Stenbacka 2001, 553). Thus, analysis of the empirical data was gathered and illustrated by using timelines.

Interviews were done using a dialogical and informal method. This encouraged interviewees to openly share their knowledge and main observations of the changes in electricity production. Energy production experts were specifically chosen as interviewees since the energy topic requires specific knowledge. These choices were made to ensure the validity of the interviews (Stenbacka 2001, 552). All interviews started with a short presentation of market shaping. Interviews were not recorded to ensure privacy. I asked permission to take notes and analyze their statements. Everyone agreed that their interviews could be part of this research. It was also agreed that only their profession and experience are stated in this report. Hence, no names, ages or company names are presented in this report or in interview notes.

Specifically, current work in wind energy affects my viewpoints. However, the researcher's long work-history in the energy sector was openly stated in this report. Different market shaping consequences are identified by using multiple perspectives and data sources. This research combines qualitative and quantitative data. Hence, the triangulation process was used to ensure the validity of the research process (Flick 2007, 92-107; Eriksson & Kovalainen 2008, 293-294).

This research has followed the guidelines of previous research. Empirical results of the electricity wholesale market were compared with an existing theory in accordance with analytic generalization procedure (Stenbacka 2001, 552). Several observations supporting the existing theory were identified. According to a coherence theory an observation concordant with previous observations is relevant.

5.5 Suggestions for future research

Research limitations, observations, and realizations provide potential future research subjects. Several possibilities to extend, confirm, and deepen the results of this research are identified. Even though several recent reports of market shaping have been completed, additional research is needed to deepen and extend the understanding and utilization of market shaping.

Markets are identified as dynamic and malleable. Hence market shaping, dealing with the foresaid dynamic and malleable concept, is dynamic and malleable. Market shaping consequences vary. Therefore, more research is needed to deepen the understanding of dynamic consequences. Some consequences may increase or decrease linearly while some follow almost wavelike patterns. Furthermore, some consequences may change irregularly or follow a nearly logarithmic curve. Future research could examine whether momentum regarding a change or a tipping point can be identified within market shaping consequence phenomena.

External events affect market shaping in several ways since a market is not an isolated entity. More research is needed to deepen the understanding between the impact of external events to market shaping and vice versa. Empirical case studies provide opportunities to gain more understanding of the interplay of internal and external events. For example, the impact of recession or pandemic to active market shaping process is an important and interesting research subject.

Since a market is not an isolated entity, future research should deepen the understanding of simultaneous multiple market shaping processes. Independent competing or supporting market shaping processes impact each other and hence the reciprocal nature of multiple market shaping processes need future research. More empirical case studies are needed to examine multiple simultaneous market shaping processes.

The nature of market shaping consequences has not yet been widely researched. For example, consequences such as planned, un-planned, significant, insignificant, immediate, and prolonged have been noted. This research identified and categorized several describing words. However, future research should aim to incorporate relevant describing words into the market shaping framework and to continue the identification and categorization work.

Wisdom after events provides opportunities to learn and understand. Therefore, future research should study failed market shaping cases. Unsuccessful cases serve as lessons learned cases and deepen the understanding of effective and ineffective methods. Even linkages to external events hindering or crushing market shaping could be identified and discussed.

Peer-reviewed articles including a company, government, or organization viewpoint exist. Often research is done using a viewpoint of an orchestrating market shaping participant. However, the role of other participants in the market system needs future research. For example, the customer role is an important factor as well as the roles of supporters and opponents. Additionally, the participant's role in the market shaping case may change during the process. For example, changing roles from a supporter to opponent is a possible scenario.

This research briefly described a few examples of market shaping. Market shaping examples of Nokia, Apple and Uber are comprehensively discussed in Storbacka & Nenonen (2018) and in other peer-review articles. However, the Ford automobile and Oatly case examples have not undergone scientific research. The Ford automobile case provides an interesting historical example while Oatly represents a recent case. The vegetarian lifestyle is increasing its popularity and therefore focusing on sustainable food production offers several topical possibilities for research, as well as possibilities for companies seeking new opportunities.

This research examined electricity production in Finland 2010-2020. Similar research later would reveal how the consequences have changed and whether some of them disappeared or new ones emerged. Additionally, answering the following interesting questions needs more research; when does market shaping end, how long are consequences valid and how the end of a market shaping process is identified.

This research serves as a foundation for possible electricity production scenario work. The current situation with electricity production is identified but, of course, interesting is what happens in the future. For example, commercialization of large industrial scale energy storage, and the start of Olkiluoto 3 nuclear power plant are probable future events that affect the electricity market.

Additionally, similar research concerning other countries' changes in electricity production would provide additional knowledge to this research by verifying or challenging observations of this research. The energy sector provides interesting case studies especially because extensive data is available due to the nature of the market.

6 CONCLUSION

Market shaping includes planned and proactive actions, which aim to modify a market. Evidently, market shaping is a powerful strategic method and hence, understanding this ample phenomenon is important for researchers and business leaders. The main purpose of this research was to participate in and provide additional knowledge to the market shaping discussion. The focus was especially on the dynamic nature and the interdependencies of market shaping and its consequences. Previous research has identified the need to deepen and widen the knowledge about market shaping, especially regarding its consequences. The importance of longitudinal research has also been stated in previous research.

The aim of this research was summarized into two research questions: What is the nature of the market shaping? What kind of consequences market shaping may cause? Research questions were answered by knowledge gained from peer-reviewed market shaping literature and by examining the Finnish electricity wholesale market during the years 2010-2020.

In 2010 the Finnish government passed a new law called: The Act on Production Subsidy for Electricity Produced from Renewable Energy Sources (1396/2010). The purpose of the law was to promote renewable electricity production, variegate electricity production, and increase self-sufficiency. In this research this governmental action is defined as a market shaping event. Vast amounts of data and evidence about market shaping phenomenon was gathered.

Analyses are based on data gathered from four interviews, numerical and written data. All written and numerical data were obtained from public sources; hence verification of data is easy. The empirical part of this research is mainly based on the following data: The Finnish Energy's annual survey Finns' attitudes towards energy, energy year presentations, hourly quantities of electricity production, Nord Pool's historical electricity price data and Finnish government programmes.

Analyses from empirical data were compared with information gathered from market shaping literature. This research provided both supporting evidence to previous market shaping research and new knowledge regarding market shaping and its consequences. Markets constantly change and adapt. The change and adaptation are evident in Finnish electricity market. Linkages to surroundings are present and overall malleability of the market are identified. Furthermore, the market shaping process is dynamic, versatile, and

longitudinal by its nature. Examples of resilience, counteraction, opportunities, and leverage are identified in the data. Evidently, all marker participants are affected by market shaping. It is a process; hence a time-element is present. Market shaping affects all market participants, the overall market, and other markets as well. Furthermore, external events affect the market shaping process and continuous intercourse with other markets and the surrounding world are important to note.

The main theoretical contribution of this study is the classification of the nature of consequences. Previous scientific research has identified several words describing markets shaping consequences. However, no uniform classification of the nature of market shaping consequences has existed. This research identifies following categories describing the consequences: orderliness, effect, significance, anticipation, immediacy, permanence, typicality, and linearity.

As this research paper is reaching its end, I would like to express my gratitude to my family for bringing happiness to my life. Additionally, I would like to thank those professionals who shared their wisdom with me during this research process. It is time to end this research paper and continue my journey.

”I see trees of green, red roses too. I see them bloom for me and you. And I think to myself, what a wonderful world. I see skies of blue and clouds of white. The bright blessed day, the dark sacred night. And I think to myself, what a wonderful world.” (What a wonderful world, Louis Armstrong, 1968)

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APPENDIX. INTERVIEW QUESTIONS

Market shaping is planned proactive and purposeful actions, which aim to change the market. Famous example of market shaping is the rise of Apple and the demise of Nokia Mobile Phones.

Evidently the electricity production in Finland has significantly changed in the past ten years. What do you think has been the major reasons for the change?

What has changed mostly in electricity market?

Have you noticed any changes in, for example, customer preferences, electricity prices and fuel prices?

There has been changes in laws, taxes, and emission prices. In your opinion, what kind of consequences these have caused?

Is there something else that has impacted the electricity market in Finland?